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Grinding and Finishing

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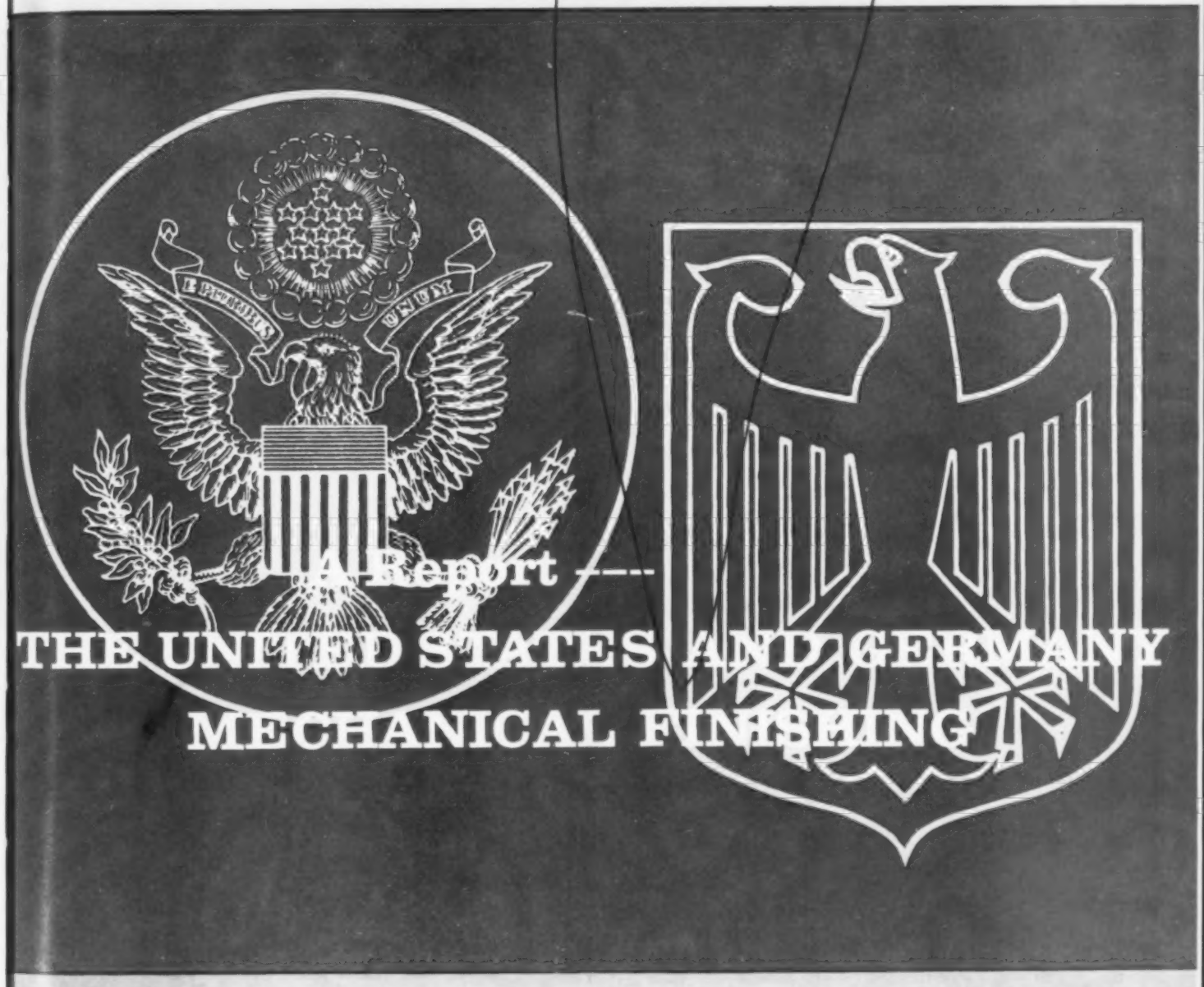


A Report —

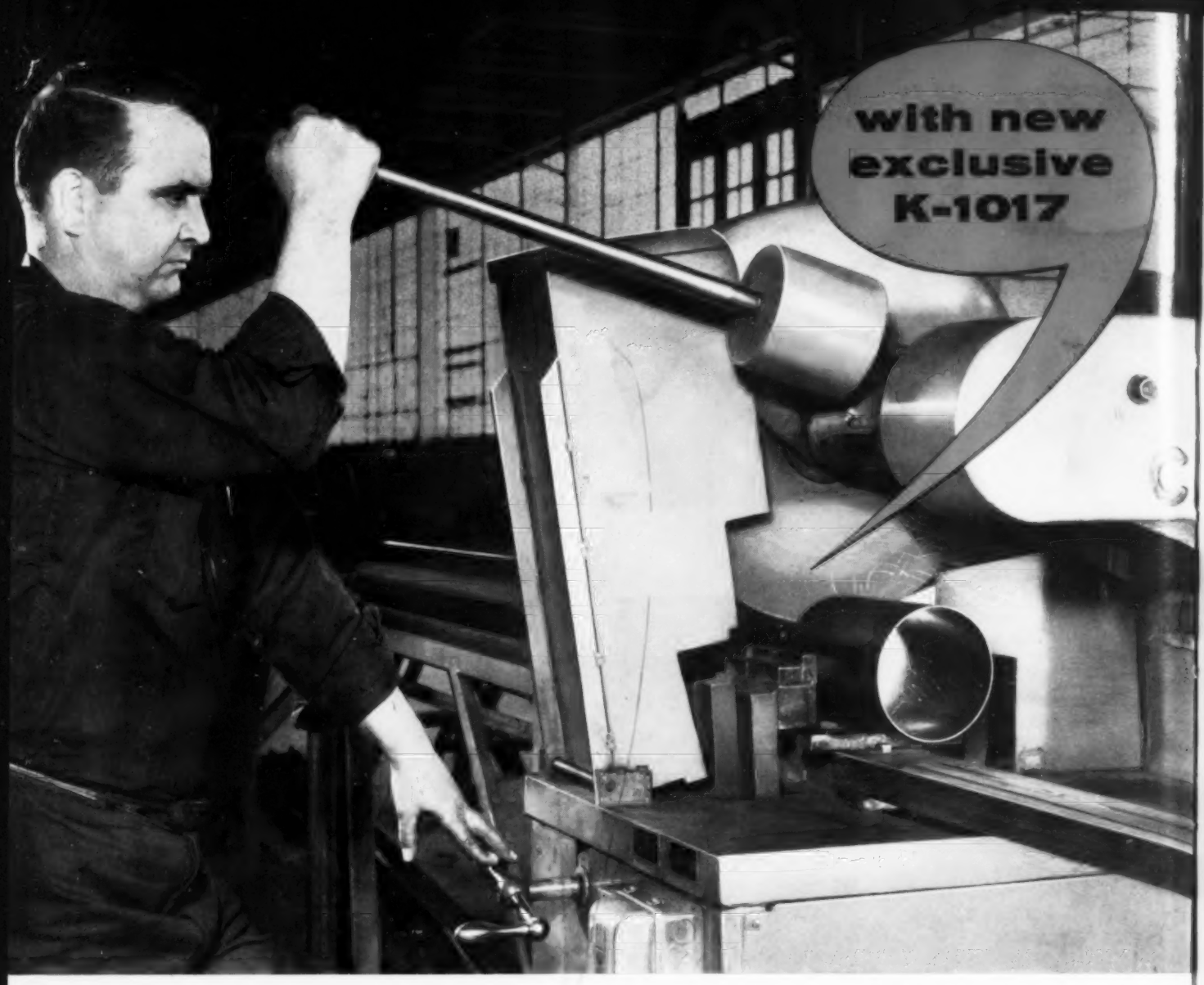
THE UNITED STATES AND GERMANY

MECHANICAL FINISHING

GRIND MACHINE KNIVES RIGHT

VERSATILITY: A BASIC TOOLROOM REQUIREMENT

TYPE 11 OR TYPE 27?



Users Acclaim New Cutting-Off Wheel

Exclusive new 66 bond formulation increases life and efficiency

"Far surpassed (leading competitor's) performance—far longer life—no burn!"
tool and die manufacturer

"Meets every requirement—production order follows!"
power transmission equipment builder

"This wheel has faster cutting action and longer life than any other wheel we've used!"
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"Test OK—will place production order!"
multi-plant steel foundry

"Operator says far superior in every way."
cutting tool manufacturer

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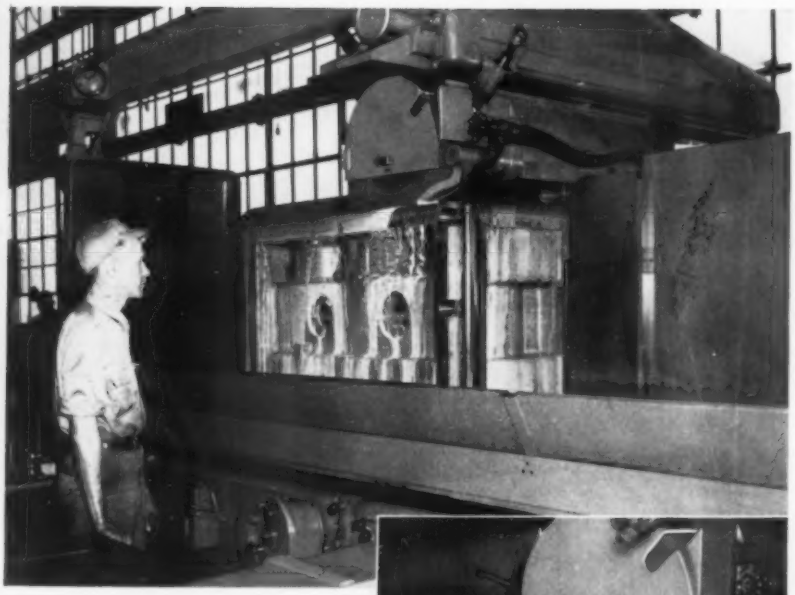

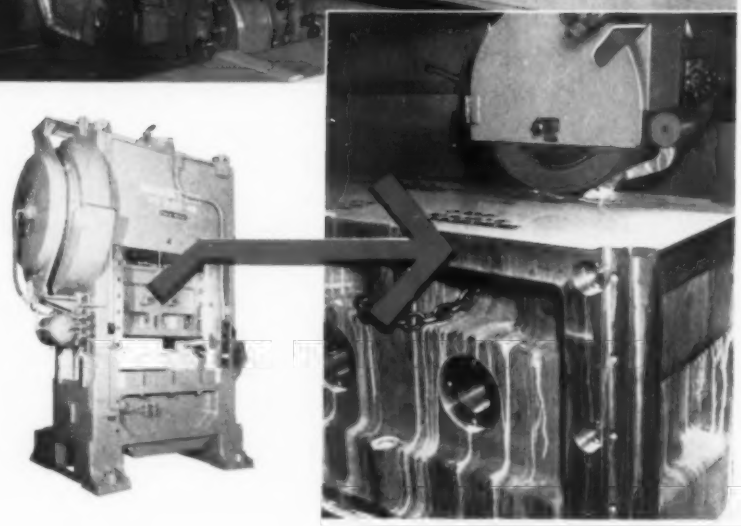

Thompson Type CX heavy-duty surface grinders are designed to grind heavy, massive work pieces. Their stock removal rate is very fast while maintaining extremely close limits of accuracy and microfinish.

Shown here is a Thompson Type CX 30x36x96 machine recently installed in the Minster Machine Company plant at Minster, Ohio. It is grinding the face of the slide for a 200-ton capacity Minster Piece-Maker High Speed Automatic Production press.

The slide is cast iron and weighs approximately 7000 pounds. It is being ground for precise parallelism and to a 20 to 30 RMS finish.

Thompson Grinders have an important part in the production of these world-famous Minster presses. The dependability of Thompson Service and the excellent performance of the Thompson machines now in use at Minster were major factors in the purchase of this latest grinder.

If your production involves the grinding of large, heavy work, it will pay you well to investigate the money and timesaving features of these modern machines.

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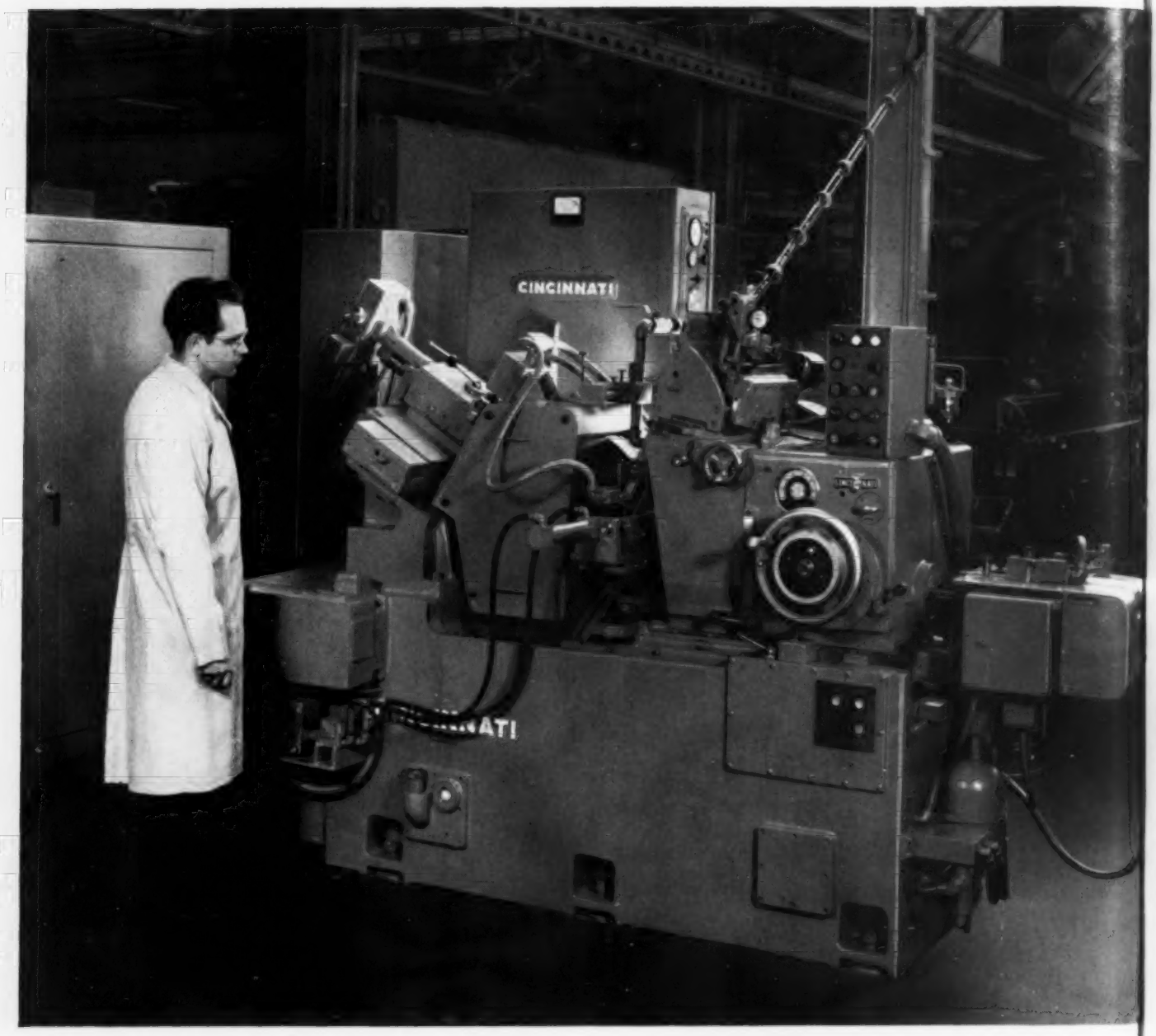
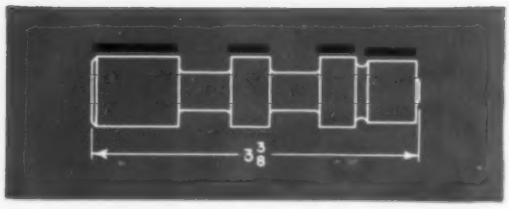


Precise cost control is attained in precision grinding transmission valves on this CINCINNATI FILMATIC Centerless Grinding Machine equipped for completely automatic operation.

CINCINNATI

FILMATIC



Part drawing. Heavy lines indicate ground diameters.

Part name	transmission valve
Material	hardened steel
Operation	grind two diameters
Production	250 per hour (80% efficiency)

BUILDERS OF PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTROL

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CINCINNATI CENTERLESS is equipped to Grind, Handle and Gage the Work... AUTOMATICALLY

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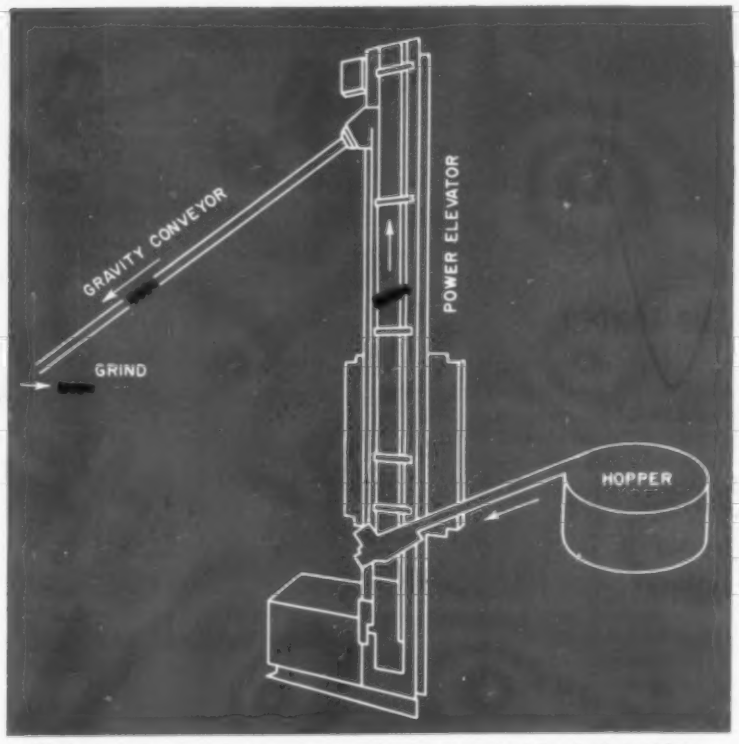
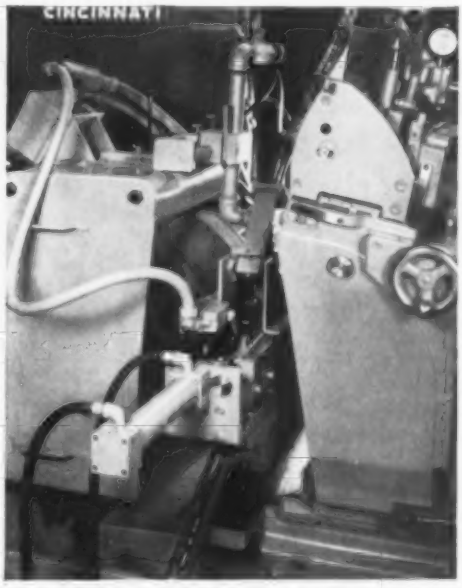
Cost control equipment includes: automatic grinding wheel balancing . . . push-button automatic grinding wheel truing with cycle counter . . . electro-hydraulic automatic infeed attachment arranged with automatic compensation for wheel wear and truing . . . hopper feed and elevator . . . automatic loading, locating and ejecting fixture . . . air-electric in-process gaging . . . and, of course, FILMATIC grinding wheel spindle bearings.

This production package performs an excellent job of grinding the parts at a dependably low cost and at a production rate of 250 per hour (80% efficiency). It is typical of the work of Cincinnati Grinding Specialists, and the way in which Cincinnati can help you reduce costs by replacing productively obsolete machine tools with new machines and methods. May we hear from you? Our Grinding Specialists will gladly study your production problems and cost structure, and make recommendations.



Work flow diagram. Parts are automatically ejected at front of machine.



The forward end of the fixture automatically takes the part from the conveyor and locates it between the wheels.

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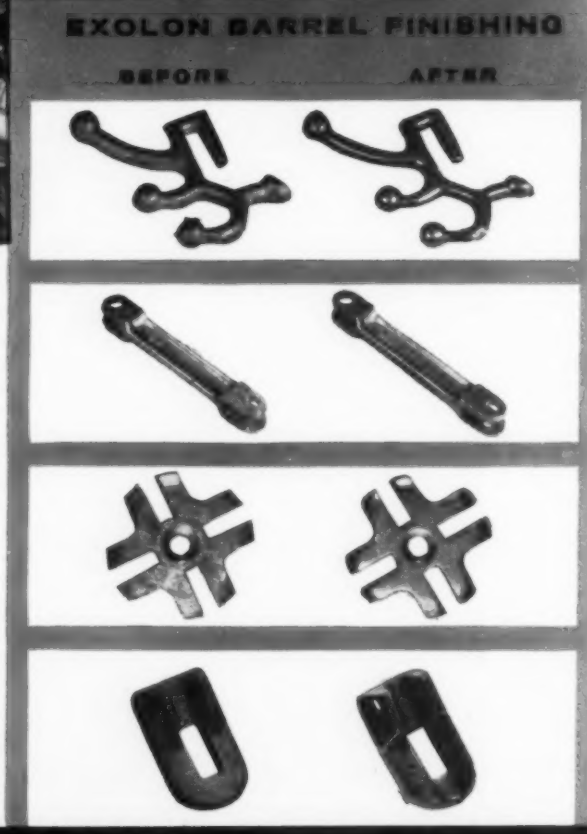

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Grinding and Finishing

For Better Production and Finishing with Abrasives

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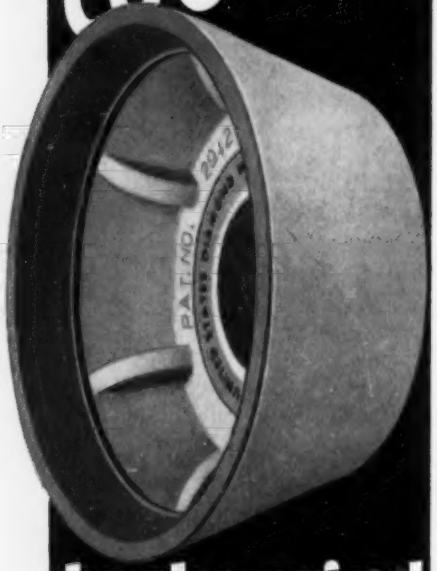

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MAN-MADE DIAMOND TESTING . . .

Discussion by R. G. WEAVIND, A. A. ROY, A. A. L. LINHOLM
(Diamond Research Laboratory, Johannesburg, South Africa)

In discussing the article entitled "Man-made diamond testing increases versatility and efficiency" by N. A. Matthews and N. L. Leventhal. (Grinding and Finishing, March, 1961), we would like to express our appreciation of the way the authors have presented it, and would like to congratulate them very sincerely on the thorough manner in which they have attacked the problem.

It was of great interest to us to know that in two entirely disassociated laboratories, work along similar lines was being carried out. In view of our work on the Wig-L-Bug*, we would like them to know that we are entirely in agreement with them that a rapid method for production control must be applied to either manufacture of diamonds or the crushing of natural diamonds to form grit.

As with Messrs. Matthews and Leventhal, we have found that production control by grinding wheel tests is impractical and that some form of analogue testing should replace these tests. At the present moment there seems to be nothing better than the "Wig-L-Bug" for the purpose of conducting these tests.

In the paper the authors say that "abrasives used in grinding, whether diamond or other material, must have certain optimum friability for greatest efficiency. As abrasive particle edges dull with wear, the grain must fracture as stresses increase to provide a fresh keen cutting edge." This is perfectly true, especially with diamond grit in resin bonded wheels. That is why a friable form of natural diamond grit was developed (Selected Natural Diamond for Resin Bond; SND-RB).

However, the "optimum friability" of the grit depends upon several factors. First, the friability should be related to the toughness of the bond. For example, a tough bond will not be suited to a very friable particle. In a tough bond very fragile particles will easily break down, leading to glazing of the wheel, whereas if the bond is less tough this could possibly be avoided.

Again, a soft resin bond should not contain strong particles, these will be rapidly dislodged from the resin leading to rapid wheel wear. The question as to whether the grit is to be used under wet or dry grinding conditions must also be examined, for resin bonds behave very differently when cooled as against the absence of coolant.

The range of friabilities encountered with grits used in resin bond applications varies from RVG up to blocky natural diamonds, and somewhere within this range there is a particular type of grit which would give the best results under the general conditions of wet and dry grinding. It may even be the case that mixtures of various types of fragile grits will give better results.

In the Diamond Research Laboratory we have established that in many grinding applications RVG is a suitable grit under "light" grinding conditions, but is not wholly suitable when the conditions become "harder."

It was for this reason that the grit now known as SND-RB was developed. This is a friable form of natural diamond and stands up to fairly heavy conditions in resin bonded wheels of a relatively hard type, i.e. "N" or "R" grade "B6" bond as made by the Norton Company.

We would emphasize, however, that the relative friability of a grit is no absolute measure of its success in a resinoid grinding wheel; the hardness or toughness of the resin bond in which the grit is employed is very much a contributing factor. For example, the grinding efficiency of SND-RB treated increases by some 20-25% merely by changing the bond from Norton R B6 to Norton N B6 in dry grinding.

continued, p. 12

*"A comparative Method for Evaluating the Strength of Diamond Grits" presented at Industrial Diamond Association of America convention, March 15, 1961.

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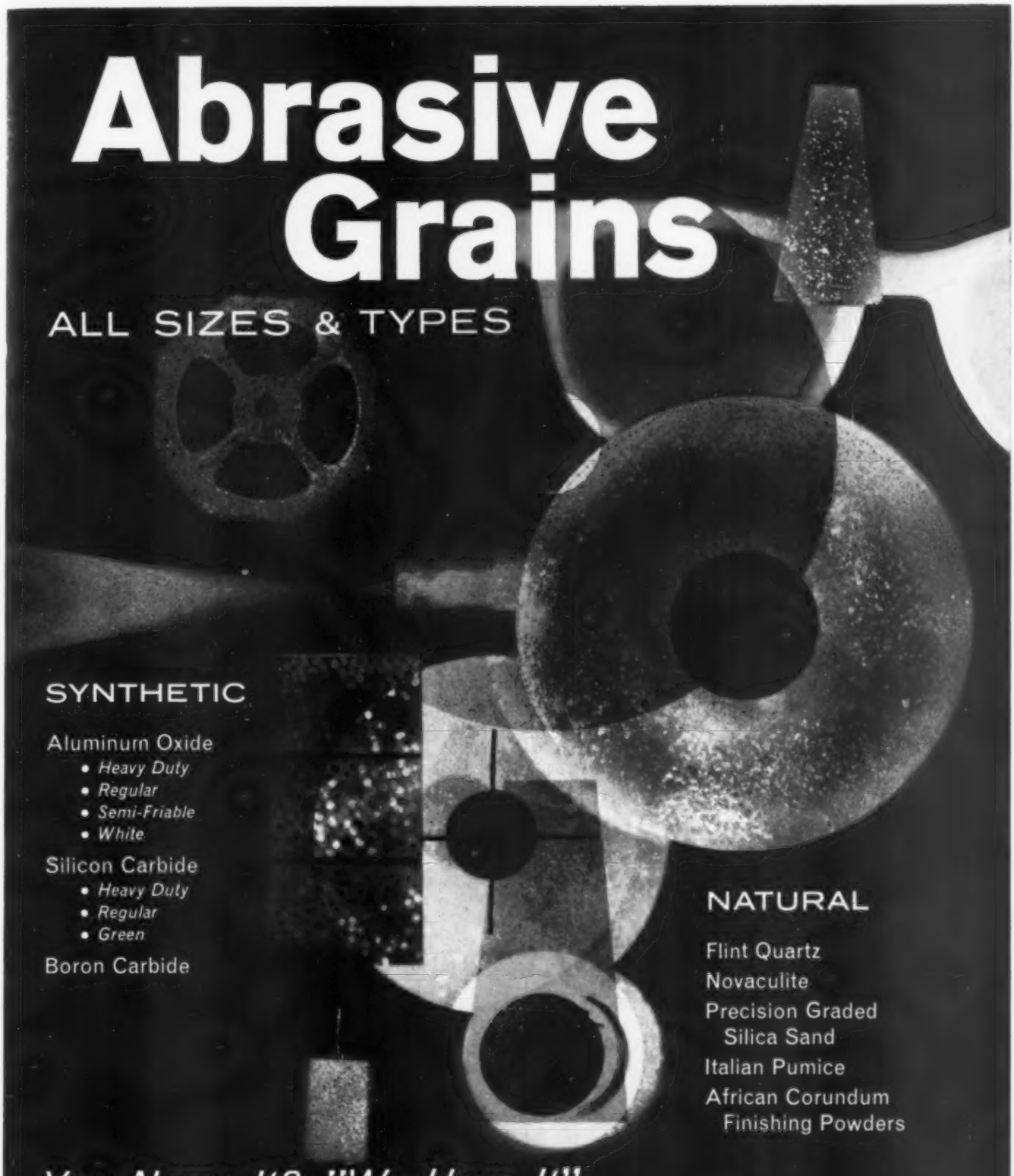

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EVERY KIND OF ABRASIVE FOR INDUSTRY

Dateline: Industry's Economy

The need to modernize and eliminate the burden of obsolescent machinery and equipment has been described as the greatest problem that "faces the American free enterprise system in this point of its development." The position was taken by the American Economic Foundation in announcing a reprint of the text of the U.S. Treasury Department's Depreciation Survey as an educational service. The Foundation noted that the survey stands as the most authoritative guide to the needs and thinking of American industry in the field of depreciation policies.

An early March Gallup Poll indicated a mixture of optimism and pessimism marking the public's thinking about the job outlook in coming months. In the East and Midwest, the common belief was that the unemployment picture would worsen during the next few months. Far-Westerners, on the other hand, believed that jobs in that region would be more plentiful by the late summer or early fall. Sentiment was evenly divided in the South.

The five major auto companies built a total 1,184,772 cars in the first quarter of 1960, 40.8% below the 2,002,229 during the same period last year. Auto dealers' new car stocks fell sharply in March, and another drop was expected in April. It was the first time in 15 months that the new car stockpile had fallen below the year-earlier level. Auto makers retailed some 486,000 cars in March, the highest for the first three months of the year. The rate of 18,000 sales a day was some 20% over February, but 16% behind 1960.

The U.S. machine tool industry, still running a close second to West Germany as an exporter, faces a long struggle to maintain its traditional proportion of world trade. In the four years 1955-58, West German tool exports totaled $686 million and those of the world totaled $2.2 billion.

Canada's 15-year experience with faster tax write-offs shows liberalization of depreciation allowances will not impair Federal Government revenues, according to Maurice E. Peloubet, author of "What Would Depreciation Reform Cost?" appearing in the **Tax Executive.** Peloubet urges faster tax write-offs so that American industry can modernize and replace an estimated $95 billion in obsolete equipment. This burden of worn-out machinery is handicapping the U.S. in competition for world markets and in creating jobs for our expanding population, Peloubet says.

Business economists will be playing bigger roles in the future leveling out of the ups and downs of the nation's business cycle, says Dr. Adolph G. Abramson, SKF Industries' director of economic planning. Dr. Abramson takes issue with fellow economists who feel business firms can't mesh national economic objectives with internal company policies. Speaking at the Pennsylvania Conference of Economists at Franklin and Marshall College, Dr. Abramson said that business has already assumed partial responsibility for attaining national goals. Calling for industrial statesmanship, he warned that when industry fails to solve nationwide problems—such as the swings in the business cycle—government will step in.

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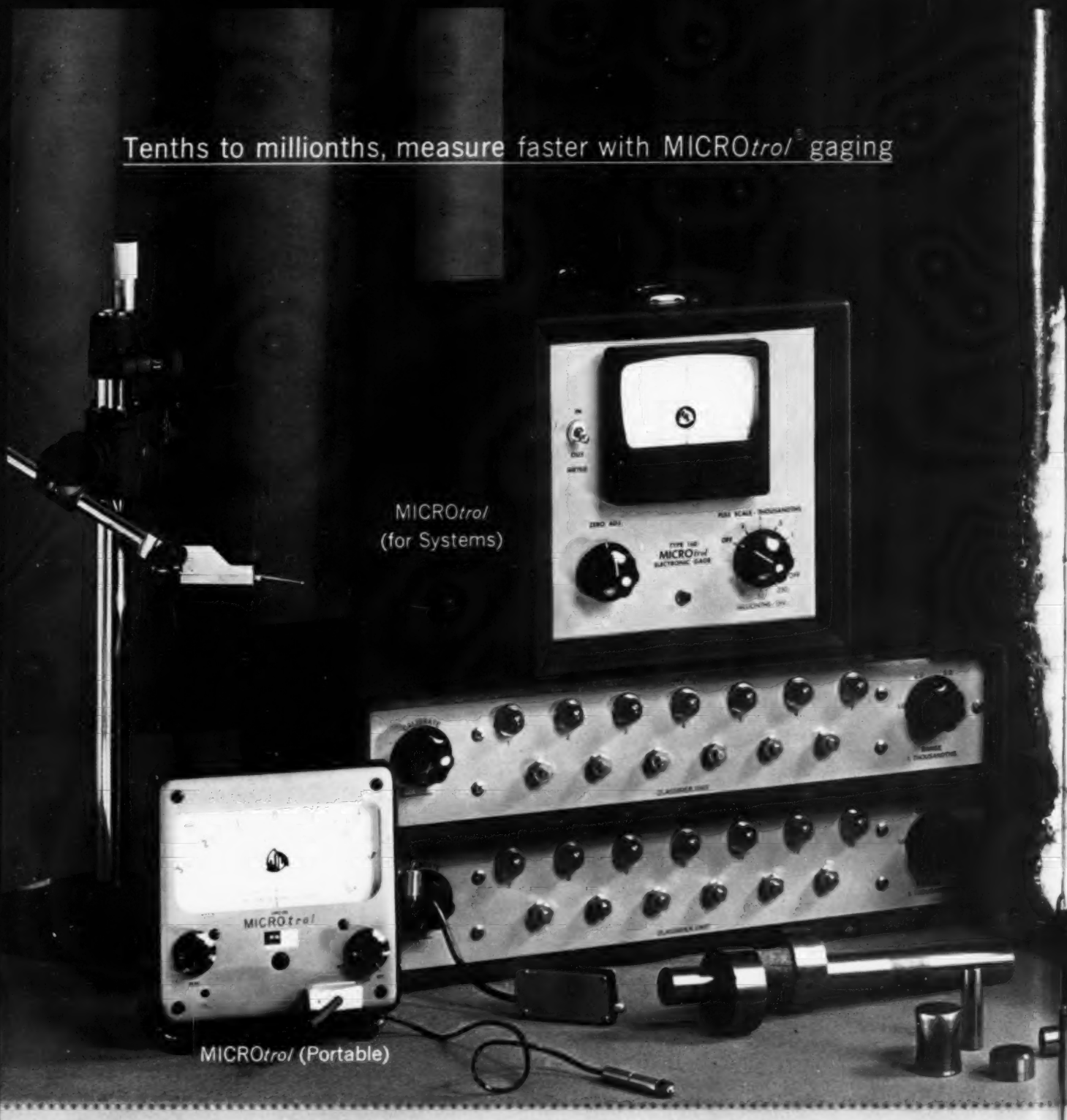

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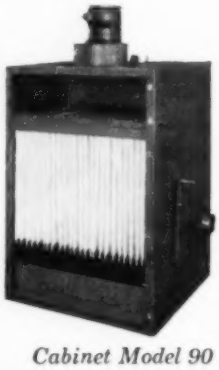
"Then I remembered a salesman with a dust collecting machine system had called on me a few months back. I dug his card out of the file and found he was from the Torit Company. I got him in pronto—and I bought one of his Model 90 Cabinet machines for less than $1,000. It services four surface grinders and it really performs. A month later I had Torit Dust Collectors installed for the rest of the machines.

"Torit Dust Collectors have practically eliminated the dust in our shop. And you can imagine the effect this has had on employee morale. People are happier and healthier. Absenteeism is no longer a problem and our production rate is higher than ever."



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EDITOR'S MAIL

Continued from page 6

Later in their paper the authors refer to synthetic grit for metal bond which has a friability value in the range 3-5%. They say: "However, even when particle strength falls in the range of natural diamonds (3-5% Friability Index), the Man-Made diamond out-performs natural diamonds significantly." We would like to draw the authors' attention to the fact that in our Wig-L-Bug determinations of relative strengths of MBG and SND-MB, we have found the former to be less impact resistant.

The authors continue by stating that although equally resistant to impact, the reason why man-made diamond out-performs natural diamond (in metal bonded applications) is that the surface roughness of the synthetic diamond is greater than that of the natural diamond grit particles. We would like to suggest at this point that their observation is not entirely correct. It is our impression that many of the MBG particles have a good crystalline shape with smooth surfaces which is not the case with SND-MB (selected natural diamond for metal bond). In other words, the SND-MB grit is the rougher of the two, the measure of "blockiness" being nearly the same for the two grits.

In conclusion, may we be permitted to comment on the Wig-L-Bug test conditions chosen by the authors, namely 7½ carats of diamond and a ⅜" diameter plastic ball. The diamond weight is three times the weight of the ball which is approximately 0.5 gms.

At the Diamond Research Laboratory we have used a single ¼" diameter steel ball with a charge of 2 carats of diamond. It is our view that highly "effective" milling of diamond grits of every size range in the Wig-L-Bug with the ½" x 1" vial may not be possible because of the small size of the vial, and the limit to the size of ball which can be used.

Increased effectiveness of milling can be achieved by reducing the diamond charge, but such a reduction brings in its trial increasing inaccuracies and errors, such as losses in screens. It can also be achieved by using larger or heavier balls made of, for example, tungsten carbide. We are, however, investigating this problem at the moment. • • •

Abrasive Engineer's Corner

ARTHUR RAKESTRAW • Contributing Editor

DISC GRINDING SMALL PARTS

• Please suggest a type of machine and the procedure for miniature double disc grinding of instrument parts—as opposed to lathe facing.—L. T., Neptune, New Jersey.

I gather from your question that your are interested in grinding parallel flat faces of small parts. The thickness of the parts would be the determining factor in establishing their adaptability to double disc grinding. As you are probably aware, a metal strip between the opposing discs provides support for the parts. If these miniature parts are too thin, it would not be practical to attempt to grind them in this manner. The opposing discs would contact the metal support in a very short time, necessitating constant replacement.

If the parts to be surfaced both sides are extremely thin, I'd suggest that you consider grinding a quantity one side at a time. If the parts are magnetic, they could be held on a rotary magnetic chuck.

If non-magnetic, they could be nested on a flat plate, using a double-sided mastic to hold them in place. A vertical spindle grinder would be best adapted for this purpose due to the large abrasive coverage and the tendency of the abrasive surface to hold down the parts.

If the parts in question are thick enough to offer support on a thin rest and are otherwise adaptable for double disc grinding, I'd suggest that you contact a double disc grinding machine manufacturer direct for information on machines to serve the purpose.

Disc wheels as small as 7″ diameter are made, but I do not know the name of the machine manufacturer. A disc grinding machine manufacturer should either have such a machine or could tell you where to get one.

GRINDING LONG BAR STOCK ON CENTERLESS GRINDERS

• Having just started to centerless grind bar stock, including both high and low carbon steel, up to 24′ in length and 1″-4″ in diameter, we can use some suggestions. We have 20′ runout tables.—R. K., Chicago, Ill.

If you are grinding unstraightened hot-drawn low-carbon steel rods, you are probably having trouble with whipping. Such rods should be run through a straightening machine before centerless grinding, particularly if they are badly bent.

In grinding, the work rest should be set so that the rod center is below the center line of the grinding and regulating wheels. With such a set-up, pressure of the wheels will hold the rod down on the work rest and eliminate a considerable amount of chatter and popping out.

In grinding the large diameter stock in long lengths, you may be having difficulty with ground flat spots resulting from intermittent work rotation. Because of the extreme weight, friction of the regulating wheel is not always sufficient to overcome the weight of the work on the work rest and the friction of the run-out table rolls. This difficulty can be overcome by power-driving one or more sets of the run-out table rolls.

"There you are, pal . . . now you shave me."

These are some of the more common problems in the application you describe. If you have any other specific problems, let me know and I'll try to work out a solution.

GRINDING MOLY STEEL ROD

• We are interested in getting more information about centerless grinding and cutting molybdenum steel rod. The steel comes to us in ¼″ diameter rods about 3′ long and is to be ground to ⅛″ diameter—.0001″, then cut to lengths of ¼″ to 1″. The rods are irregular in diameter and would be difficult to chuck for turning. I don't yet know the precise analysis of the steel, but it is in the range of 30-40 Rc.—G. B., Chicago, Illinois.

Any slight out-of-round condition can easily be corrected in the first few passes on the centerless grinder, before an attempt is made to make maximum reduction passes.

The hardness of the steel should not cause any difficulty on the centerless grinder. It could of course be some class of high speed steel which might offer some difficulty had it been hardened, no problems should be encountered in the soft or annealed condition.

Because of the small diameter, the suggested wheel specification would be 54 or 60 grit aluminum oxide in grade O or P, vitrified. As you are aware, very small diameters like these have a tendency to break down the wheel face due to the small arc of contact.

The cutting operation could well be set up on an abrasive cut-off machine. An 80 grit aluminum oxide rubber bonded wheel, in about grade V, with a coolant should give satisfactory performance.

It should be possible to set this up to cut several rods at a time. • • •

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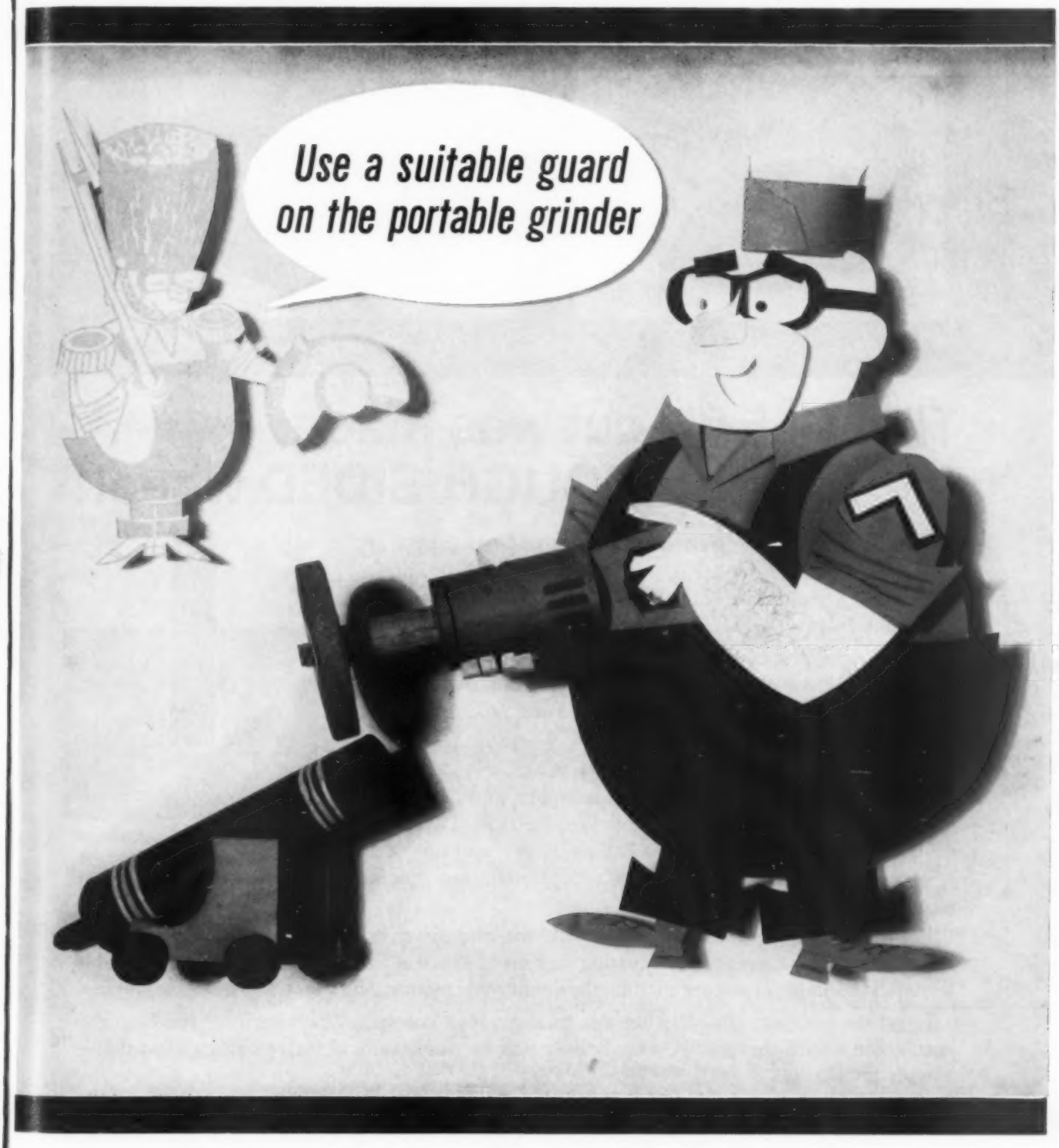

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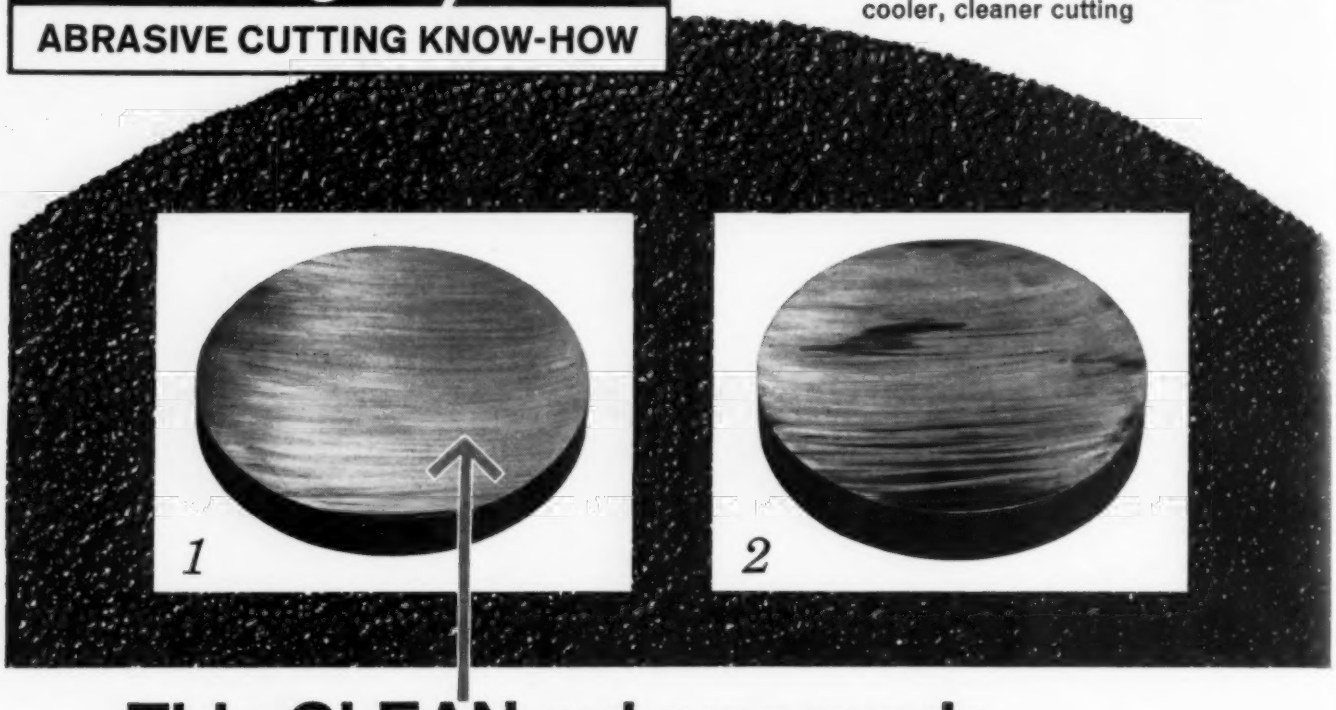
Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

Close-up view of resinoid wheel shows rough texture that provides cooler, cleaner cutting

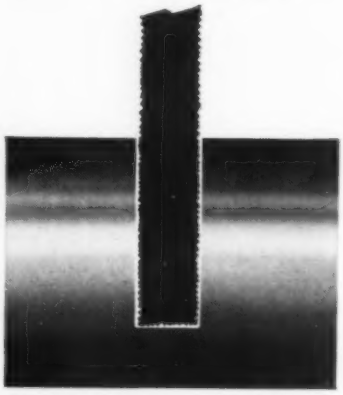


This CLEAN cut was made with a ROUGH-SIDED wheel!

1 • **THE SPECIMEN ON THE LEFT ABOVE** was cut from a 3¾" diameter hardened steel bar in just 28 seconds with an ALLISON *rough-sided* dry abrasive cutting wheel like the one shown in the background. Note that the cut is clean and practically burn-free.

2 • The specimen on the right was cut under the same conditions and with a wheel of the same formulation, but *without* rough sides. The result—the cut took 30 seconds and produced a badly burned surface.

3 • The secret is the extra clearance the rough sides give *inside* the cut (as shown in the small picture at right), and the resulting *cooler* cutting action. This adds to wheel life, too. That's why, for the dry abrasive cutting of solid bars, heavy-wall tubing and structural shapes, ALLISON-CAMPBELL field engineers generally recommend rough-sided wheels.



3 Inside the cut, rough-sided wheels give extra clearance, extra cooling for faster cutting and to prevent burning

For dry cutting of thin-wall tubing with minimum burr, a fine-grit, *smooth-sided* wheel is the choice. And for *wet* abrasive cutting, dozens of ALLISON wheel specifications are available to match the material you are cutting, the quality you require, and the cut-off machine you use.

Regardless of your cut-off problems, your ALLISON-CAMPBELL field engineer can help you choose the wheels that will give the results you want. He is an abrasive cutting specialist—use his know-how.

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Metalworking on the move

A London trade expert has predicted a $40 billion world market for U.S. traders in 1970. U.S. exports will more than double in the next 10 years, according to Geoffrey S. Browne, managing director of a London economic publication. He predicted European trade blocks will grow stronger in the next five years and will permit a freer flow of American goods abroad.

Steel price cutting, which started in early June in stainless steel and spread to transmission-line oil-pipe, reached another major class of products by the middle of the month. U.S. Steel withdrew its price list on steel reinforcing bars, used to strengthen concrete. In 1960, these "Rebars" accounted for more than 3½% of all finished steel shipments. From now on, U.S. Steel said, prices on this product will be quoted only in answer to "specific inquiries." U.S. Steel announced in mid-June that it is boosting production of its Gary, Ind., works to the highest level since the period immediately following the big 1959 steel strike.

The operations of 188 gray iron foundries were at 71% of capacity in May, compared with 60% in April. In May they shipped 88,458 tons, including 1,325 tons of ductile iron and some 536 tons of high alloy iron castings.

U.S. imports of steel continued to rise in April while export declined. The U.S. bought 23,500 tons of foreign steel during the months and sold 138,000 tons to foreign buyers. April steel exports were valued at $31.6 million and imports at $28.2 million based on the market value at foreign ports.

Two automotive manufacturers—American Motors Corp. and a Kaiser Industries Corp. affiliate —will build American Motors' Rambler cars in Argentina, pending that country's approval. Production is to start in early 1962. The cars are to be built at the Cordoba plant of the Kaiser affiliate, which currently builds a version of the old Kaiser cars, Renaults, Jeeps, and other models. Some 45,000 autos will be built there this year.

The Research and Policy Committee of the Committee for Economic Redevelopment (CED) has offered a comprehensive program for the elimination of areas of chronic unemployment. Noting the paradoxical situation of the existence of these sore spots in an otherwise growing economy, the CED program called for a variety of remedies. Included in these was a program of stepped-up vocational training to prepare the chronically unemployed for new jobs in home areas or elsewhere; subsistence during their training; local efforts by management and labor to promote growth and improve competitive positions by lowering production costs; and the establishment of Federal Reserve Development Corporations in each of the 12 Federal Reserve districts to supplement state and private financing of new business ventures and necessary public facilities for stricken areas.

Some 75 delegates and technical representatives of the Electric Tool Institute visited the plants of the Black and Decker Manufacturing Company in early June. The visit included conducted tours of Black and Decker's electric tool plants at Towson and Hampstead, Maryland; discussion meetings by management, sales, and technical groups of the institute; and a tour of the Gettysburg battlefields.

In the next 10 years, men in the business of marketing steel through service centers will have to "innovate to survive," according to Wayne Rising, retiring president of the Steel Service Center Institute, at a meeting of more than 800 institute members in Washington, D.C. Rising said "our 1970 model" will require imaginative innovation in at least five areas: inventory management, service management; sales management, people management, and profit management.

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Design for Grinding

RICHARD L. McKEE • Managing Editor

Grind better test specimens faster

Minimal production cost, widest range of materials, closer tolerances are some of the major advantages when form grinding replaces the traditional turning and polishing for preparing metallurgical test specimens.

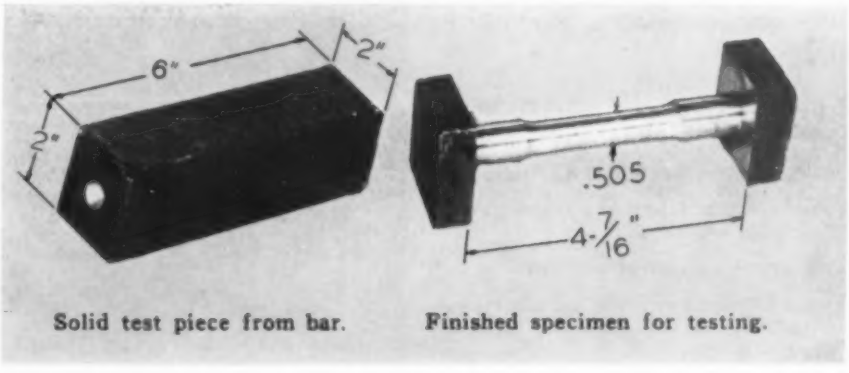
Operator examines freshly-ground "coupon" (specimen). This test is common procedure at the mills, at customers' plants, in laboratories.

● Form grinding produces metallurgical test specimens that are better, or at least equal to those produced by turning and polishing, and without any limitations from hardness or other properties of the material. Grinding does the job up to ten times as fast, with more accurate tolerances.

The typical steel mill test specimen illustrated was form-ground from the solid in less than six minutes on a Sheffield Crushtrue® grinder. This contrasts with up to 45 to 60 minutes required for turning and polishing, the current method in many steel mills and testing laboratories. Abrasives finish the specimen in one operation rather than two.

Form grinding also provides closer tolerances, better surface finish without heat discoloration or damage, and reductions in residual stresses. It can be used on all metals, regardless of hardness or other properties.

continued



Solid test piece from bar. Finished specimen for testing.

DESIGN FOR GRINDING
continued

These are the facts:

Problem
Grind form in 2″ x 2″ x 6″ bar down to .505″ diameter tolerance ± .003″.

Material
Typical specimen bar, soft or heat treated.

Abrasive wheel
Vitrified aluminum oxide, 80 grit, M grade, open structure, 20″ x 4⅝″ x 8″, Crushtrue dresses to grind from the solid in one operation. Wheels must be selected to suit the material being ground.

Wheel speed
Machine design and guarding, wheel grade, permit 7200 rpm.

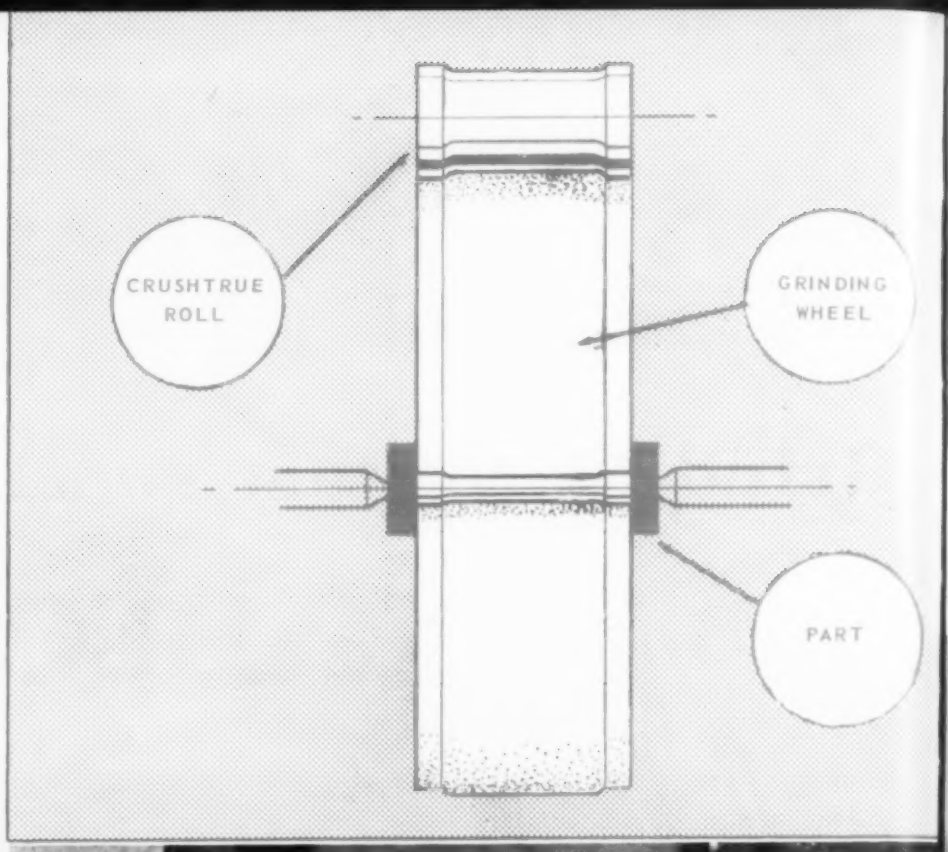
Time
Part form-ground in 5 minutes, 37 seconds, with 8.7 cubic inches of metal removed.

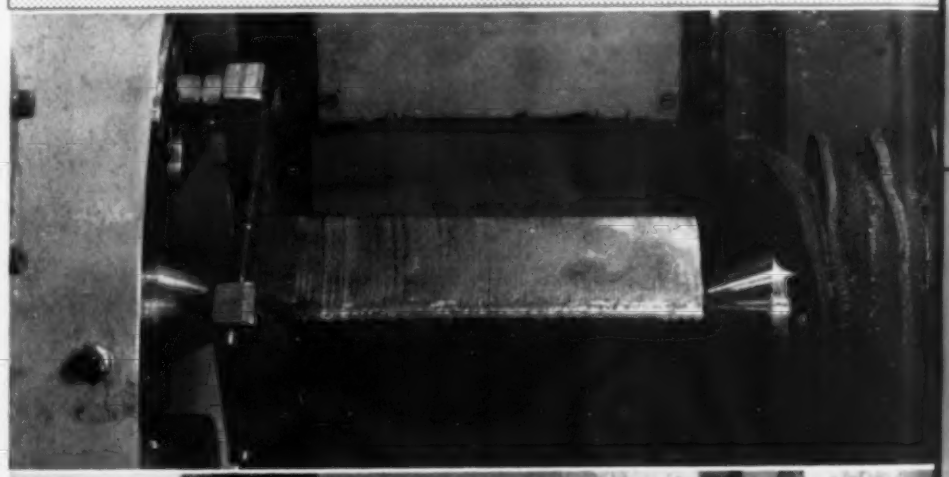
Tolerances
Actual tolerance held to ± .001″ on diameter.

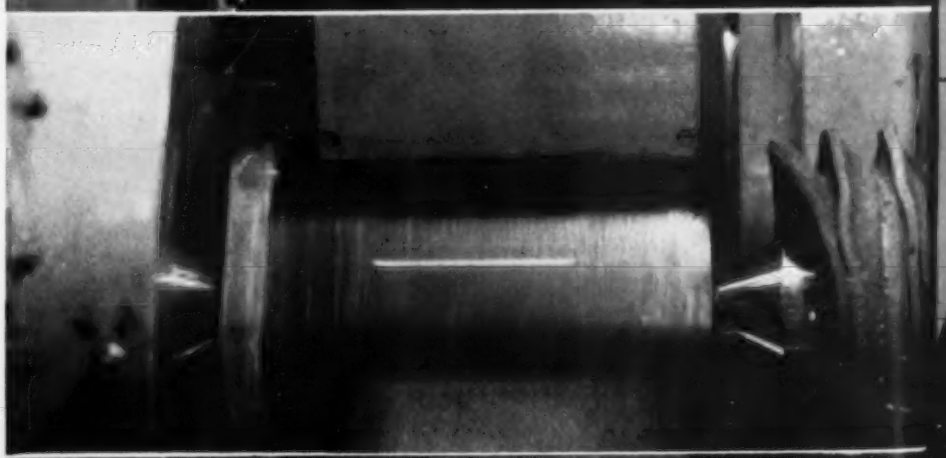
Surface finish
28 to 32 microinches, satisfactory for most shop specimens. With finer grit wheels, finishes down to 10-12 microinches can be produced for laboratory work.

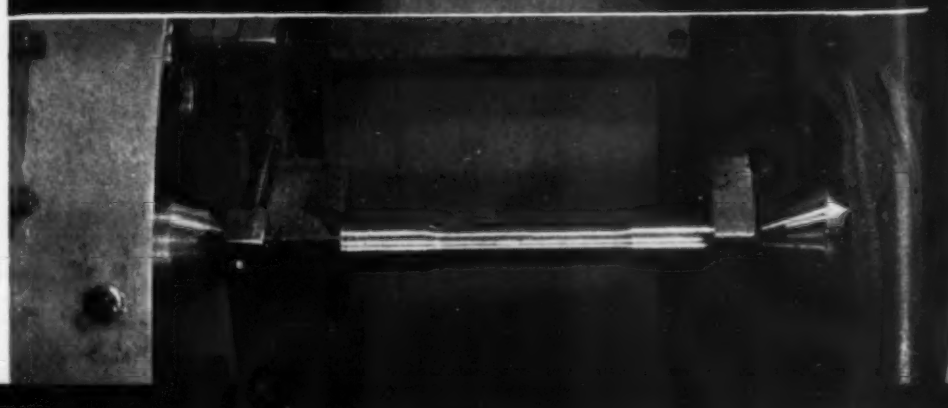
Similar test bar configurations have been ground from the solid in comparable times with materials such as austenitic stainless steel; Armco ingot iron; experimental tool steels, 1% carbon; cold rolled steel in the 1010-1020 range; and hi-tensile steel alloys.

The process can also be used with appropriate wheel specifications to grind test specimens in copper, brass, aluminum, plastics, exotic metals—any ferrous or non-ferrous metal in either the soft or heat treated stage. Squares, rounds, or irregular shapes can be ground with equal ease. Specimens can be ground to any desired form. • • •









Schematic (above) illustrates the Crushtrue principle.

Series of photos shows (from top):

Sample located between centers and driven by workhead;

The grinding operation; and

Finished part requiring no additional processing, ground from the solid in one operation.

faster finishing...by far!

The new SWECO Vibro-Energy* Finishing Mill does in 35 to 165 minutes what ordinary vibratory equipment *takes 5 hours to do.* Results of 8 impartial comparison tests (weight loss in grams and RMS improvement, on cast iron, hard steel, stainless and aluminum) prove SWECO produces the same finish *in 45% to 88% less time.* Charts of all 8 tests are included in a new, illustrated technical treatise that will be mailed on your request. It describes in detail the superior performance of high-frequency, three-dimensional vibration in finishing metal, ceramic and plastic parts. For a copy, write SOUTHWESTERN ENGINEERING COMPANY, 4800 Santa Fe, Los Angeles 58, Dept. 84726

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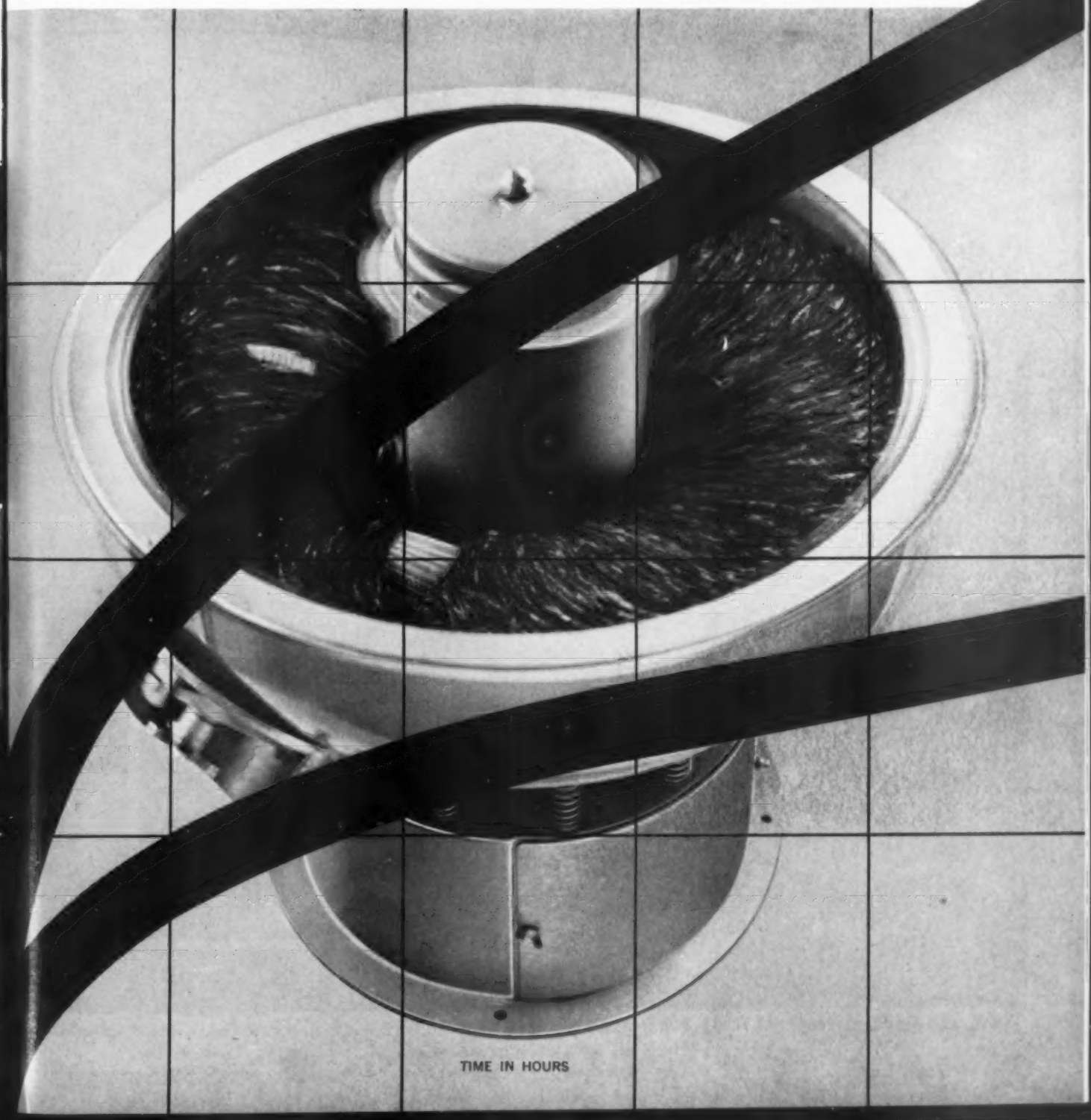

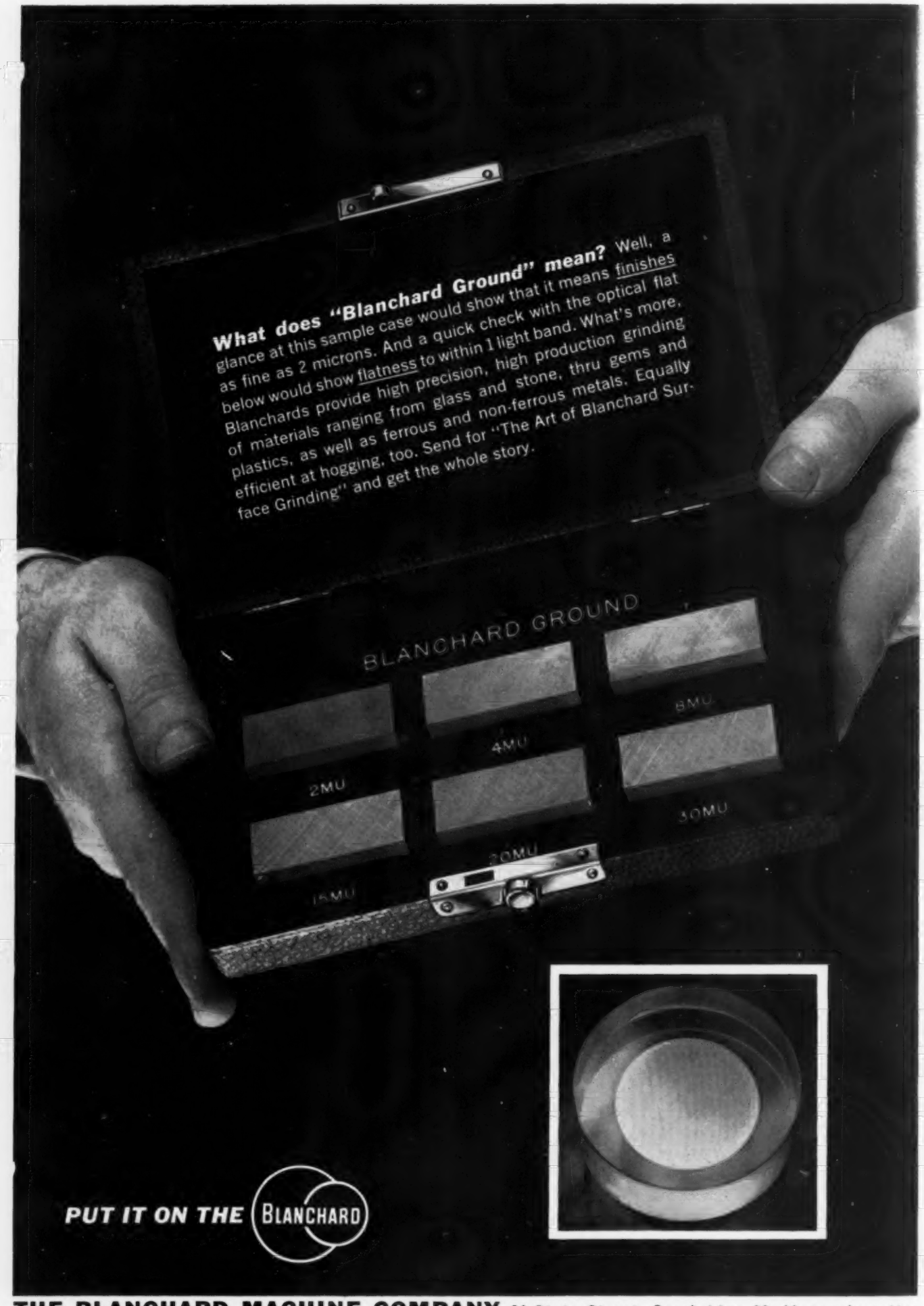
What does "Blanchard Ground" mean? Well, a glance at this sample case would show that it means finishes as fine as 2 microns. And a quick check with the optical flat below would show flatness to within 1 light band. What's more, Blanchards provide high precision, high production grinding of materials ranging from glass and stone, thru gems and plastics, as well as ferrous and non-ferrous metals. Equally efficient at hogging, too. Send for "The Art of Blanchard Surface Grinding" and get the whole story.
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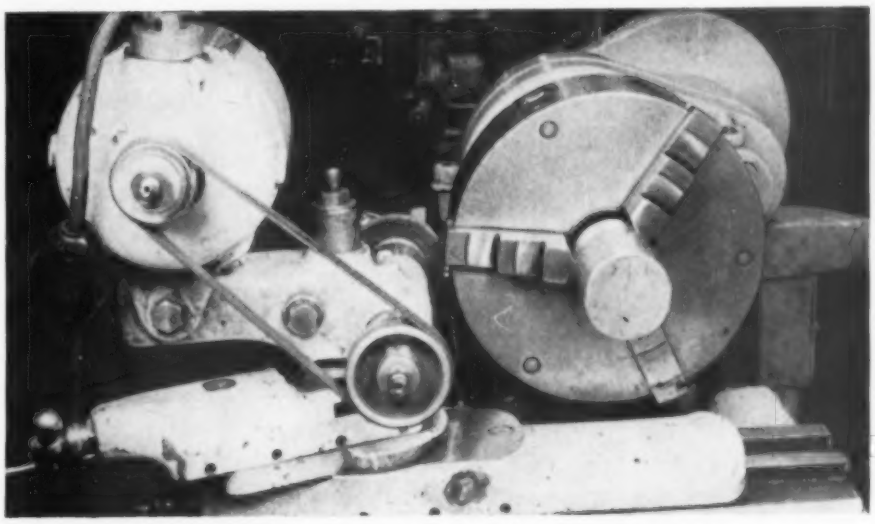
RE-GRINDING THE JAWS OF A UNIVERSAL LATHE CHUCK

By H. J. Gerber

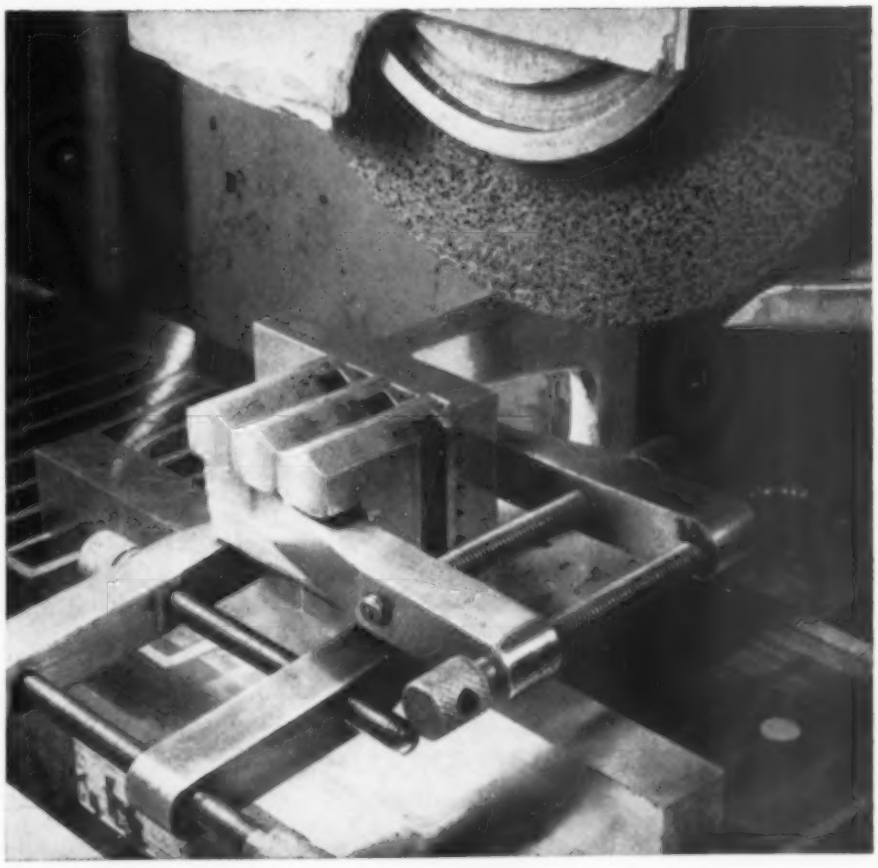
• We have made successful use of the following method of re-grinding the gripping faces of a universal lathe chuck: The chuck is first mounted on the spindle of the lathe on which it is to be used. A piece of truly round stock is next gripped tightly in the jaws, preferably near the outer ends in the position in which many small jobs are often held. A tool post grinder is next mounted on the carriage and a clean-up cut is taken on the exposed peripheral surfaces of the three jaws.

The three jaws are then removed from the chuck and mounted on the surface grinder with the previously ground surfaces seated clean on the magnetic chuck. The jaws are clamped tightly against an angle plate for support and all three gripping faces are then ground to a common plane parallel with the peripheral ground outer surfaces.

This method will usually prove successful in truing badly worn jaws to within a couple of thousandths. In some cases where the scroll is badly worn it will be found necessary to remove a few extra thousandths from one individual jaw face after indicating the point of greatest runout.



Step 1. Grind peripheral surfaces of three jaws while jaws are gripped tightly on piece of round stock.



Step 2. Grind gripping faces of all three jaws. Jaws are seated on previously ground peripheral surfaces.

FOR CLEAN CENTER SOCKETS

By Clifford Molloy

• We have a number of cylindrical grinders in our shop. When we are performing an operation which does not require the use of the tail stock we usually remove the center as a safety measure. The sharp point can be a hazard when inserting or removing work from the chuck or when gaging the work.

Before the center can be replaced it is essential to clean the socket. This is not the easiest thing to do and most of the dirt gets pushed into the bottom of the socket. To prevent this we have taken some old centers and ground the points off. When the regular centers are removed these "safety" centers can be placed in the socket to prevent the entrance of dust and dirt. We have found them very handy.

• • •

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YOU GET (PD) UNIFORMITY

Cincinnati supplies you with wheels of uniform excellence, because of the unique (PD) manufacturing process which involves 36 separate and unvarying quality controls.

Every step, from grain mix to final inspection, is directed to uniformity of product. For example, while vitrified wheels are being fired, automatic recording analyzers keep sampling the kiln atmosphere to maintain desired oxygen content throughout the firing process.

RESULT: DEPENDABLE PERFORMANCE

You can *depend* on (PD) WHEELS because each reorder wheel gives you exactly the same good job as the original.

Using (PD) WHEELS you will find production going up, and costs going down . . . *to stay!* This is the promise —and the performance—of Positive Duplication.

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WESTERN MASS. CONCLUDES WITH TALK ON MARKINGS

Western Massachusetts chapter concluded a "highly successful season of meetings and lectures" May 15 with a talk on grinding wheel markings by **Norman Kendall** of the Cortland Grinding Wheel Company.

Officers for the 1961-62 season were elected. **James Bell,** Pratt & Whitney Aircraft, is the new president; **Albin Overgard,** Greenfield Tap and Die, vice president; **Carl Bowers,** Carborundum, continues as treasurer; and **Frederick Oginz,** Hayfred Company, as secretary.

Though the chapter has only 31 members, 75 men have participated in programs during the season.

Twenty-four members and guests attended the meeting, which was originally scheduled for February and postponed because of snow.

View from the speakers' table as delegates listen to president Jim Bair at the Atlantic City convention. He emphasized that the Society so far has only scratched the surface of its possibilities.

ANNUAL SPORTS NIGHT STARS OLYMPIC TRAINER

Steve Witkowski, head trainer for the U. S. Olympic team at the 1960 games in Rome and at the 1956 meet in Melbourne, Australia, was featured at the Connecticut chapter's annual Sports Night, May 22, at the Villa Capri restaurant, Wallingford, Conn.

Fifty members attended.

The speaker showed slides of the Olympics and of his trip through Europe. The talk was described as "fascinating and very well presented."

SAGINAW VALLEY ELECTS OFFICERS: HEARS TALK

New president of the Saginaw Valley, elected at the May 17 meeting, is **Ross Boergert,** former first vice president. Also re-elected were **Thomas A. Hancock** for his fourth year as treasurer, and **Edmund L. Markey** as secretary.

Thomas Rowe and **Frank Krohn** were named as first and second vice president, respectively.

J. W. Walther, sales manager, Roto-Finish Company, Kalmazoo, Michigan, was the evening's speaker. He discussed various types of vibratory finishing machines and their applications in precision finishing, deburring, descaling, polishing and burnishing.

Twenty-eight members and five guests were in attendance. The meeting was held at Naismyth's Restaurant, near Saginaw.

ELECTRONIC FILTRATION APPLIED TO GRINDING

George F. Landgraf, vice president of engineering for Trion, Inc., discussed with the Long Island chapter the application of electronic filtration to grinding and polishing operations, to eliminate smoke and mist.

The meeting was held at Wheatley Hills Tavern, Westbury, on June 14 with 47 members and guests in attendance. He discussed operating principles and general applications.

NISULA PROBES ADVANCES IN CARBIDE GRINDING

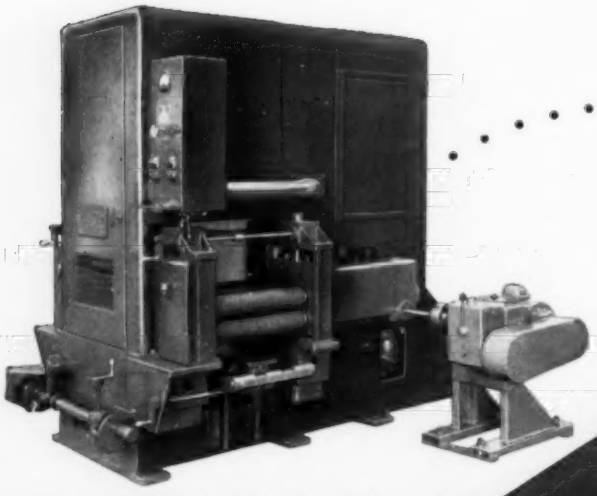
C. A. Nisula, product manager for vitrified and diamond products, Simonds Abrasive Co., Philadelphia, spoke concerning progress in carbide grinding at the Cleveland chapter's May 11 meeting at the Cleveland Engineering and Scientific Center. He dealt primarily with diamond wheels.

He also touched upon the bright future for abrasives in industry, pointing out instances in which grinding is replacing other types of machining.

NEW JERSEY VIEWS FILM, STAGES SPRING DANCE

A combined report from the New Jersey chapter, indicates that a showing of the Norton Company film, "Old as the Hills," attracted some 35 members and guests in April.

On May 19, the chapter's annual dinner brought out 75 couples.



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(Pinch Roll Type)

For pre-finishing, conditioning and polishing sheets, plates, strips or blanked-out shapes in flat form. Used as single units or in multiple units for progressive line polishing.

for FINISHES that pass inspection the FIRST TIME get a HILL Grinding & Polishing Machine

The basic HILL two-roll vertical head with endless abrasive belt. Used in both the Pinch-Roll and the Hydraulic Table types.

MM T=PE

● HILL 2-ROLL Vertical Abrasive Belt Grinding and Polishing Machines are made in two general types for producing superior finishes on flat surfaces as required by manufacturers of a wide variety of products such as decorative plastics, auto bumpers, engravers plates, home appliances, etc.

Both types are built in polishing widths up to 60" and larger sizes can be furnished if desired. Your problem will be given our prompt and careful attention.

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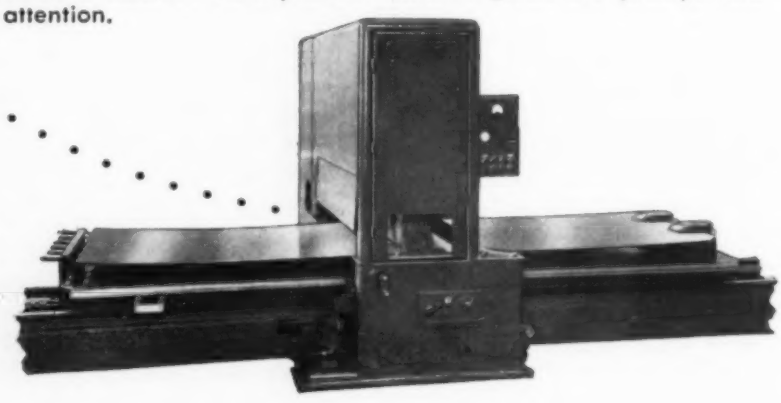
(Hydraulic Table Type)

For flat polishing of sheets and plates of ferrous and non-ferrous metals. Made in a variety of table widths and lengths with full hydraulic reciprocating table.



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How important are you?

In all the world controversy over power politics, economics and political ideals, not a single phrase is spoken on the part played by abrasives. If we were to wait for a mere mention on TV, radio or in the front pages, we could develop quite a complex. For some, the thought of this diminutive place in the world is enough to start a squeal of defense or justification. For others, it is looked upon as fate. Still others have never reacted; the world problems are one thing and theirs are another.

The world leaders, the country's leaders must be concerned with the over all scene. How does industry as a whole fit into the social and economic world picture and how does our industry stack up to that of our adversaries? This may make our portion of the industry appear to be insignificant. But, let's not forget while appearing to be insignificant, we are indispensable. The fact is, our industry is a major element in the world conflict.

Machining is the backbone of every major power in this world. Abrasive machining is the most important single constituent in the machining industry. Historians state that every important trend is noted by events which have lead up to it. With this in mind, we are reminded of the bombing of bearing plants which is reported to be one of the turning points in the war. This is an industry which does almost all its machining with abrasives. We also recall the importance of abrasive imports to our intelligence corps in determining production rates of our enemies during the same war.

How important are you? Try to visualize what our situation would be without abrasives to make the bearings, on which just about every moving part must depend. How could we build any product with close tolerances? Without abrasives, missiles would not fire and jets would not fly. And, how about cutting tools? There isn't a single cutting tool produced today which could perform with any proficiency without abrasives. How far back would farming be set without abrasive operations?

Archimedes stated, "Give me a place to stand and I will move the earth." Our industry has a place to stand and can move the earth. It is up to us to exploit this position and to apply it for the greatest advantage. Regardless of how much mention the industry receives from the world leaders, you are the most important basic industry in the world.

W. W. Patterson

Editor, Grinding and Finishing

A Report --- THE UNITED STATES AND

By HEINRICH OSTERRATH, chief application engineer Hermes Abrasives, Hamburg, Germany

Editor's Note: After spending some time in our country, Heinrich Osterrath, presented a seminar in the Detroit area. The seminar, sponsored by United Mineral & Chemical Corp. and Clifford Rockwell Company, was attended by 56 representatives of American industry. This article represents the remarks made at the seminar plus additional observations made by the author during the weeks he was in this country following the seminar.

● The most significant difference between American and German bumper part polishing is that there has been no flat polishing done in Germany up to now. Other points of difference are the use of manual polishing pressed parts, and the use of flap type wheels.

In Germany bumper parts are polished mainly by manual methods (belts or setup wheels) or by mechanical methods (straight line, rotary or rectangular automatic machines). Condition and quality of the sheet and strip material used for the bumper parts determines the size of installations, grit sequence, necessary prepolishing and touch-up operations, etc. Production rates per day in Germany might well be established between 600 and 12,000 depending upon construction of bumper or the number of parts per car.

Planning for the processing of a pressed bumper part through an automatic polishing machine to achieve a given surface quality, re-

CHART 1

Unalterable Facts & Requirements of Design and Production	Influence on Cost, Size of Installations, Labor, Surface Quality, etc.
Quality of Raw Material	Sequence of operations
Shape of Part	Grain sequence in general
Number of pieces required	Number of people employed
	Type of Installation
Handling methods along the press lines	Pre-polishing operations
Pressing and Stamping tools (condition)	Alteration of grain sequence
Conveying means	Spot-grinding
Welding	General rectification methods with difficult shapes
Established grain sequence	Through-feed i.e., production rate of installations
Over-all operational sequence	Position and distribution of heads along the automatic line
Polishing installations planned and/or purchased	Distribution of belts, flap-wheels and sisal buff
Coated abrasives costs	Necessary touch-up work
RMS—readings required on the finished part	Plating thickness
	Type of plating
Plating Cycle	Type and size of buffing installations, if any
	Corrosion requirements
	Quality of plated surface

GERMANY-- MECHANICAL FINISHING

Bumper parts, one of the major applications of coated and buffing operations, are the media of comparison between American and German methods. The author describes the German evaluation of methods applied and comments on the relative use of the methods in the two countries.

quires a great deal of consideration. We start first with the facts and requirements of design and production and then determine the factors which influence cost, size of installation, labor, surface quality, etc. (Chart 1).

GERMAN INSPECTION

Visual inspection of final appearance of the plated part determines the quality of the part. Results of this inspection also determines possible corrections of the polishing, buffing or plating procedures, and the exact estimation of rejects to be reprocessed. Chemical inspection is also used.

Methods of Visual Inspection

Profilometer readings of approximately $\pm 20\%$.

Continuous at end of every production line by operator.

Continuous checking during touch-up by operators.

Copper is usually buffed on automatics, some of German origin, some of American origin. A touch-up operation especially on awkward shaped parts usually follows the mechanical buffing process and parts not meeting requirements are sorted out. Rejects are processed through the polishing lines again, being plated after this operation. There is usually a demand for holding rejects below 5%.

At the end of the plating line the finished parts meet a very close inspection at a chain conveyor, on individual inspection tables or on rubber conveying belts. Women sit along lowered chain conveyors inspecting chromium plated parts under controlled light, wearing dark glasses to protect their eyes. On the table inspection is done with parts which do not allow a full view of the entire surface because of their shape. Rubber conveyor belts are installed for smaller parts such as hub caps, bumper guards, window frames, etc. (Chart 2).

TYPICAL GERMAN AUTOMATIC OPERATIONS

Part: Bumpers, two piece type (200-250 sq. in. per piece)

Ford Motor buffing is completely automatic while Germany uses many manual operations.

CHART 2
Comparison chart of Polishing Methods on Bumper parts: U.S. — Germany

	U.S.	Germany
Flat polishing installations for bumper parts	Yes, extensively	No
Combined operations flat polish: touch up (manually or mechanically)	Yes, extensively	No
Manual polishing of pressed parts which have not been polished in the flat state	Limited to special shapes and surface requirements.	Extensively done
a) with abrasive belts	Limited to special shapes and surface requirements	Extensively done
b) with setup wheels	Limited to special shapes or surface requirements	Limited to special shapes sometimes done in combination with c/a belts
c) with flap type c/a wheels	No	Limited to special touch-up operations on mechanically processed parts.
Mechanical polishing of pressed parts which have not been polished in the flat state	Either no, or on parts which only need some slight surface conditioning	Extensively done.
a) with abrasive belts	Very limited	Extensively done.
b) with setup wheels	Special shapes and surface requirements	Limited to parts which have a good surface condition
c) with flap type c/s wheels	No	Extensively applied along with abrasive belts

CHART 3

No. of part	time/cloth belt	time/paper belt
No. 1	0.76 min.	0.83 min.
No. 15	0.80 min.	1.00 min.
No. 30	0.93 min.	1.18 min.
No. 32	0.93 min.	1.17 min.
No. 45	0.86 min.	- - - -
No. 48	1.02 min.	- - - -

Machine: Rectangular, return motion, 25 heads. (German)

Abrasives: 13 belt heads—12 flap type heads.

Part: Small bumper guards.

Machine: Straight line, return type, 28 heads. (U.S.)

Abrasives: 10 belt heads—18 flap type heads.

Part: Bumper guards, large (approx. 1.5 sq. ft.)

Machine: Straight line, 38 heads. (German)

Abrasives: 8 belt heads, 18 flap type heads, 2 sisal heads.

Part: Bumper guards medium size.

Machine: Straight line, return type, 25 heads. (U.S.)

Abrasives: 10 belt heads, 15 flap type heads.

Sequence of Operations

1. Manual pre-polish including weld removal and blending of serious imperfections such as drawing lines or waviness of flat surfaces.

   Abrasive: Resin bonded cloth belts, 120-240 grit according to stock removal.

2. Automatic polishing cycle (contours).

   Abrasives: Resin bonded cloth belts, 150-240 grit. Flap type wheels, 180-320 grit.

3. Manual touch-up operations.

   Abrasives: Resin bonded cloth belts, 280-400 grit. Setup wheels (limited), Sisal wheels (limited), Flap type wheels (limited).

Paper Vs. Cloth

The problem of paper backing and cloth backing is also encountered in Germany. The following is a case history on one such problem.

Part: slightly contoured center part of three piece bumper. About 150-180 sq. in.

Sequence:

1. Manual polishing with a 180 grit 3″ wide cloth belt.
2. Manual polishing with used 180 grit belt greased.
3. Copper plating.
4. Copper buffing, etc.

Contact Wheel: 14″ x 4″, 40 durometer, type 61, serrated design.

Speed: 2600 rpm.

Machines: 8 polishers.

Parts per belt: Cloth-46. Paper-34.

Time per part: Cloth-.824 min. Paper-.991 min.

Price of belts: Cloth-342 units. Paper-150 units.

The production of the cloth belt was approximately 35% over the paper belt. Savings in actual polishing time by the cloth was approximately 17%.

The price differential favors the paper belt but it was still not possible to change to paper due to the paper failing to give benefit of its full life because of breakage. The reason for this was found to be the softness and serrations of the contact wheel plus the heavy loads applied. These conditions cause either cracking along the center line or breakage. A softer contact wheel would have resulted in longer working time and reduced belt

life. Studies of the behavior of paper belts under these conditions are going on now in the European coated abrasive industry.

Chart 3 provides the relative time factors for cloth and paper belts on manual work. Paper belts work well on flat areas, and there is normally no trouble introducing them for replacement of cloth belts in Germany. Paper belts still work fairly well on slightly contoured surfaces. But, as soon as the load on the belt is increased with a 40 durometer contact wheel and radii of less than 2", cloth belts are more economical.

Effects of Running Direction on Type 61 Contact Wheels

The normal operation on bumper parts in this particular case was to put the contact wheel on the machine with the sloped edge first. This gave satisfaction over a certain period of introduction. Belt consumption was checked with the results being to reverse the contact wheel running direction to take advantage of the sharp edges of the contact wheel.

The results of the checking are shown in Chart 4. Fifteen operators, normally doing the same job changed the running direction so that the sharp edges lead. Total average increase in belt life was 9%.

CHART 4

Operator	Higher Production Per Belt
1	7%
2	9%
3	13%
4	13%
5	8%
6	12%
7	6%
8	9%
9	7%
10	11%
11	8%
12	5%
13	6%
14	12%
15	6%

CHART 5

Wheel No.	Wheel Type	Duro	Pcs/Belt	Min/Piece	Cost Piece (Units)
1	Normal type 61	50	45	.750	14
2	Normal	40	55	.700	12.5
3	Normal, new	46	47	1.015	16
4	Normal One year old	36	46	.962	16

CHART 6

Test No.	Wheel type and age	Pieces/belt	Min/piece	Cost/Piece (Units)
1	Normal, new	60	.913	13.8
2	Normal, used 1¼ years	35	1.150	19.8
3	Normal, new	60	.860	13.0
4	Normal, used ¾ year	43	.940	16.3
5	Normal, new	54	.802	13.4
6	Normal, used ¾ year	40	.850	16.1
7	Normal, new	60	.725	12.1
8	Normal, used ¼ year	50	.772	13.6

Effect of Contact Wheel Hardness

The following case history illustrates the effect of contact wheel hardness on belt life, time per piece and cost per piece.

Parts: Same as above.
Operation: Manual polishing.
Contact wheels: 16" x 3" rubber serrated.
Speed: 1800 rpm.
Belts: 3" wide, 180 grit.
Results: Cart 5.

Effect of Contact Wheel Age

Still another German case history illustrates the effect of contact wheel age on pieces per belt, time per piece and cost.

Part: Same as above.
Operation: As above.
Contact wheel: 16" x 3" rubber serrated, 42 durometer.
Belts: As above.
Results: Chart 6.

The results of these tests determine the life of the contact wheel or re-coating for maximum production. Cost of re-coating was approximately 170 units. For this unit cost the following production days were required to amortize the re-coating.

¼ year of use—34 days

¾ year of use—16 days

1¼ years of use—8 days

Wheel dimension changes after 1¼ years were from 69 mm to 56 mm useable width and tooth height from 11.5 mm to 7.5 mm. All these tests were based on a production rate of about 70,000 parts per month.

As there is no flat polishing going on in the German automotive industry up to now and about 50% of all parts are still manually polished either with abrasive belts or to a limited degree with setup wheels, it was and still is of the highest importance to any factory which uses belts to watch carefully their belt consumption and perform exact and elaborate time measurement studies on mass produced parts. • • •

For longer life, better performance

GRIND MACHINE KNIVES RIGHT

By E. T. LARSON Grinding Engineer • Norton Company

Best technique includes short intervals between regrinds; use of medium grit, soft grade wheels; grinding with cutting edge up; thorough honing.

● Machine knives under perhaps a dozen aliases—shear blades in the steel industry, hog and chipper knives in paper, paper knives in graphic arts, to mention only a few—are widely used today. Their performance is only as good as the users' techniques of regrinding their cutting edges.

The manufacturer's best steel, most painstaking heat treatment, most precise bevel and edge, and most ingenious packing can deliver only one cutting edge per knife to the user. The remainder of the knife's edges are the user's responsibility. And it is no more difficult nor time-consuming to put a keen, efficient edge on the knife than it is to do a half-way job, unsatisfactory on every count.

Proper knife regrinding requires timing, careful wheel selection, good grinding techniques, and, in most situations, unhurried honing. More machine knives have been ruined by too long intervals between regrinds and by too much heat during resharpening than by any other cause.

Know When to Sharpen

Knowing when to sharpen is as important as knowing how. In production it is often simpler to change and re-sharpen knives on a planned basis—at the end of every shift or every other shift, every other day, or every week.

Learn to recognize the signs of a dull knife. Then change it for a sharp one before the quality of the work begins to suffer, and before the cutting edge has broken down completely. Some observation is required to determine the time it takes for a knife to become slightly dulled and to require a minimum of reconditioning, but it pays off in better quality, less total regrinding time, better performance.

Dull shear blades tend to cut out-of-square and to consume excessive power. They should be changed in any case before the cutting edge has rounded over or spalled as a result of continued use after the edge has become dull.

An increasing percentage of sawdust, oversize and bruised chips is the danger signal for chipper knives. For paper trimmer knives, crushed or ragged edges on the trimmed sheets indicate dullness; and diagonal streaks indicate nicks or burrs on the knife edge. When the peeled log starts to fuzz, it is time to change the veneer knife.

Use the Proper Wheel

Manufacturers of machine knives are unanimous in advocating the use of relatively fine grit (and soft grade) wheels—cylinder, plate mounted, or segmental—for regrinding.

One well-known manufacturer recommends 80 grit wheels or segments —Norton's 38A80/1-H8VBE, for instance. They consider the use of such a wheel so important to the life and performance of the knife that they print a "Grinding Instructions" card recommending these wheel specifications and attach one to each knife when it is packed for shipment.

Twenty-five years ago manufacturers approved the use of 46 grit wheels and earlier it was common practice to use wheels as coarse as 36 grit. K grade for resharpening chipper and even paper knives. Most complaints of short life stem from continuation of these practices.

The cutting edge produced by grinding the bevel with a 36 or even a 46 grit wheel, examined under a high power glass, is rough, with minute valleys and peaks which break off under load, leaving the edge dull.

A good cutting edge should be as nearly an unbroken line, where the bevel and the face surfaces join, as it is possible to obtain. An 80 grit soft grade wheel readily penetrates the surface of the hard, dense steel, and requires less pressure to cut than does a coarser grit wheel, minimizing the danger of burning the edge.

Preferred Grinding Method

Assuming the knife grinder is of the horizontal spindle type equipped with a cylinder or segmental type wheel, the operator has a choice of grinding with the cutting edge down, or up.

continued

Manufacturer's recommendations for regrinding come packed with each knife.

"Edge up" is the proper slogan for machine knife grinding. Arrow points to edge.

Honing a paper knife to remove feather edge left by grinding. Oilstone is tipped up about 1/16″ at heel of bevel.

The preferred grinding method is with the cutting edge of the knife **up**, so that the rotation of the wheel is from the cutting edge toward the body of the knife. When the knives are of the "laid" type, the wheel cuts the alloy steel edge first, carrying the chips toward the softer steel back. It also carries the generated heat **away** from the cutting edge. Moreover, when grinding wet, as is always recommended, the coolant is much more effective, since the full stream strikes first where it is most needed, on the edge of the knife.

The coolant generally used is a dilute mixture of water and a soluble oil or other non-rusting additive. It is important to use a generous flow of coolant; too little coolant will cause alternate heating and quenching of the knife with consequent softening and heat checking of the cutting edge.

Honing the Knife

After paper trimmer and veneer knives have been reground on the bevel, they must be honed to remove the wire or feather edge invariably left by the grinding wheel. The life of the knife and the quality of its cuts depend to a large extent on the thoroughness of this honing job. Simply knocking off the feather edge with a few strokes of an oilstone does not constitute honing.

While operators in different mills have their own ideas as to the right method of honing a machine knife, the objective in every case is the same, namely, a cutting edge that appears as an unbroken, straight line, without nicks or burr even when magnified.

The following method is recommended by a well known manufacturer:

Support the knife on a bench at a comfortable height and angle for honing, and be sure the light is adequate to clearly inspect the edge.

Using a Soft Arkansas oilstone about 8″ x 2″ x 1″ and dipped in kerosene to lubricate it, hone the knife with the stone tipped up about 1/16″ at the heel of the bevel as shown leaving about .007″ wide land at the cutting edge for strength. Note that the operator is using both hands to support the stone firmly as he strokes the edge with a circular motion along the length of the knife. As the honing operation nears completion, the pressure of the stone on the knife is gradually reduced.

The wire edge that may have been pushed back by the oilstone is cut off by resting the stone flat against the face of the knife and using a series of chop strokes to shear off the burr.

The choice of size and type of oilstone to use also varies from one plant to another. Some paper mills, for example, use an 8″ x 2″ x 1″ Medium India oilstone resting flat on the bevel for rough honing, and a Hard Arkansas stone tipped up 1/16″ for finish honing.

In another paper mill, the operator uses a rectangular piece of hard steel to cut off any trace of wire edge that may have been pushed back by the oilstone. Previously, the operator had finish-honed the knife with a Hard Arkansas stone applied to both sides of the cutting edge and tipped up about 1/16″ at the heel of the bevel.

One way to tell if a knife has been honed properly is to hold a piece of note paper lightly between the thumb and forefinger, and push it lengthwise against the cutting edge. The knife will readily shear the paper, but the presence of any minute nicks in the edge will send a small tremor up the paper which can be felt. The spot should be marked for further honing.

Another way to tell whether all the wire edge or burr has been removed is to draw a handful of cotton waste along the edge. If the edge has a tendency to cut the waste, there is still a wire edge that should be honed off. If there are still some fine nicks left, the waste will be caught at these places which should then be marked.

Regardless of the method used, the honing operation, to be done thoroughly, cannot be hurried. Performance figures on paper and veneer knives show that the more thorough the honing job, the greater the life between regrinds and, therefore, the over-all life and economy of the knife.

Some years ago a machine knife manufacturer pointedly summed up his observations on the importance of correct grinding procedure in the following statement. It bears repeating today. "There can be no question that a good knife correctly ground and honed, and properly used will give twice the life and twice the output of an improperly ground, abused knife no matter how good the latter was to start with." • • •

Acknowledgment: Photographs courtesy Lancaster Machine Knife Works, Inc.

SPACER LAPPING TO MILLIONTHS

By GENE GLEASON and GEORGE C. BOWEN
Micro Surface Engineering Company

To manufacture precision spacers in increments of .0001″ holding within .000050″ for thickness and 4 rms finish is not just a machining job, but rather like a study in the art.

Typical lapping operation set-up from which accuracy of millionths can be obtained.

● Precision spacers represent a system of very accurate shimming. They are used to adjust the distance between two adjacent parts of an assembly. The parts adjusted may be the two end plates of a gear pump or the mass assembly of the gyroscope in its gimbals. The one requirement common to all precision spacers is the extreme accuracy of the flat face surfaces.

Spacers commonly used in the electronics industry range in thickness from .037″ down to .009″ in increments of .0001″. The outside diameter of these parts is .625″ and the inside diameter is .400″. The material is 52100 steel hardened to a 60-63 Rc, and the surface finish has to be maintained to 4 rms. The thickness tolerance on these parts is plus .000050″ and minus .000000″.

The obvious problem on this job is to hold the faces parallel enough to make measurement of the parts easy and dependable. With parallelism maintained, the size tolerance is easy to establish by accurate controls of the time cycles.

Parallelism in this case is achieved by averaging of the numbers. Therefore we run as many parts as possible in one load. The two plates are held apart by the three largest parts in the load until they are lapped even with the rest. By using this principle in frequent short runs parallelism within a few millionths can be achieved on ideal parts.

A titanium alloy combination bulkhead spacer and seal, 13″ outside diameter, 11″ inside diameter and only .070 inches thick had to be lapped to a .001″ flatness and parallel within .002″ T.I.R. The surface finish had to be maintained below 8 rms.

We removed .002″ stock from each side of these parts and met all other requirements by using a 500 grit silicon carbide abrasive suspended in a very low viscosity oil. The slurry of two pounds of abrasive per gallon of oil was mixed constantly in an agitated tank and fed on the lapping plate at just under one gallon per hour.

Titanium requires a good supply of sharp hard abrasive and low surface speed but when these requirements are met it is no problem to lap.

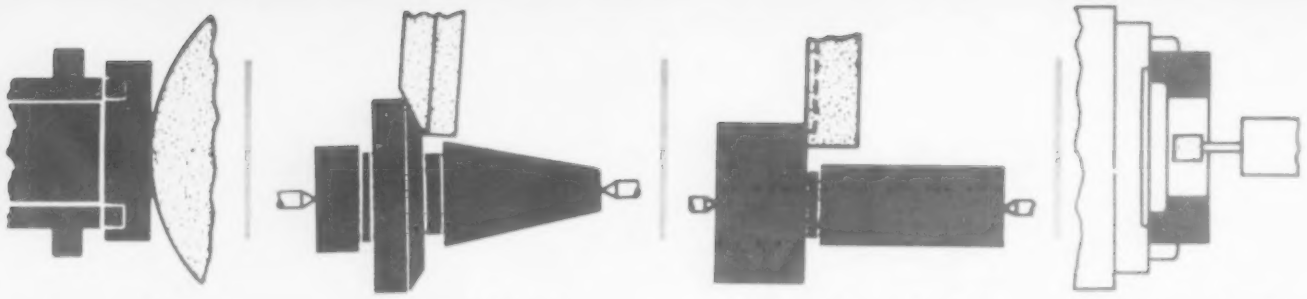
A beryllium copper clutch plate with a .540″ outside diameter and a .187″ inside diameter was lapped to .006″ plus or minus .0001″ thickness and held flat and parallel within .0001″ T.I.R.

This material is very stress sensitive and requires extreme care in the selection of the proper abrasive type and grain size. Because of the material involved and the thinness of the part, the lapping pressure was also important. An additional requirement was that the surface finish be maintained below 4 rms.

This last requirement dictates the use of a fine abrasive but the need to achieve an economical stock removal prompts us to use the coarsest grain possible. The abrasive finally chosen was a fused aluminum oxide in a nine hundred grit.

An accurate surface roughness measuring device is an absolute necessity in doing this type of work. We have conducted experiments among a number of production and inspection personnel to determine how accurately they can estimate surface roughness by offhand methods.

Our conclusion is that the best guesses of even these highly trained people are not nearly good enough for today's tolerances. • • •



face grinding | bevel grinding | shoulder grinding | internal grinding

VERSATILITY: a basic toolroom requirement

Because of the wide range of requirements in every conceivable area of toolroom grinding, economical set-up and versatility of equipment are essential. The universal grinder provides the versatility and fast set-up.

● The universal grinding machine is a versatile machine tool. It is universal by both definition and application. Designed to handle the wide variety of small lot jobs, single piece, material and sizes of work requested of the toolroom, universal grinders can and do perform such varied operations as are shown on this page.

Simplicity of set-up or change over from one small lot size run to another is of equal importance. Fast set-up increases the number of jobs run in a day and thus provides greater economy.

Using the Cincinnati universal grinders as an example in the following cases will illustrate the advantages of the universal grinder.

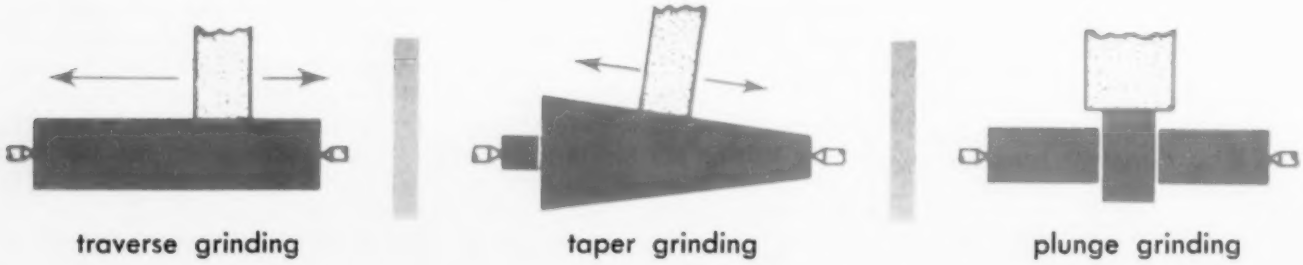
On a shaft which requires traverse grinding up to a shoulder formed by a large diameter, and then plunge grinding of the larger diameter, a number of features will reduce set-up time. Table positioning is fast and accurate using two rates of table movement. The rapid movement rough positions the table while the final positioning is made with the fine movement. Table reversal dogs can be quickly set without using a wrench. Finger pressure releases the dogs for positioning. For accurate positioning a knurled screw and thumb nut can be used to bring the dogs to final position.

Work rotation speeds, traverse rates and tarry time are all infinitely variable and easily adjusted. When the traverse rate and headstock speed has been selected, both headstock and table may be stopped, and the coolant turned on or off by a single lever.

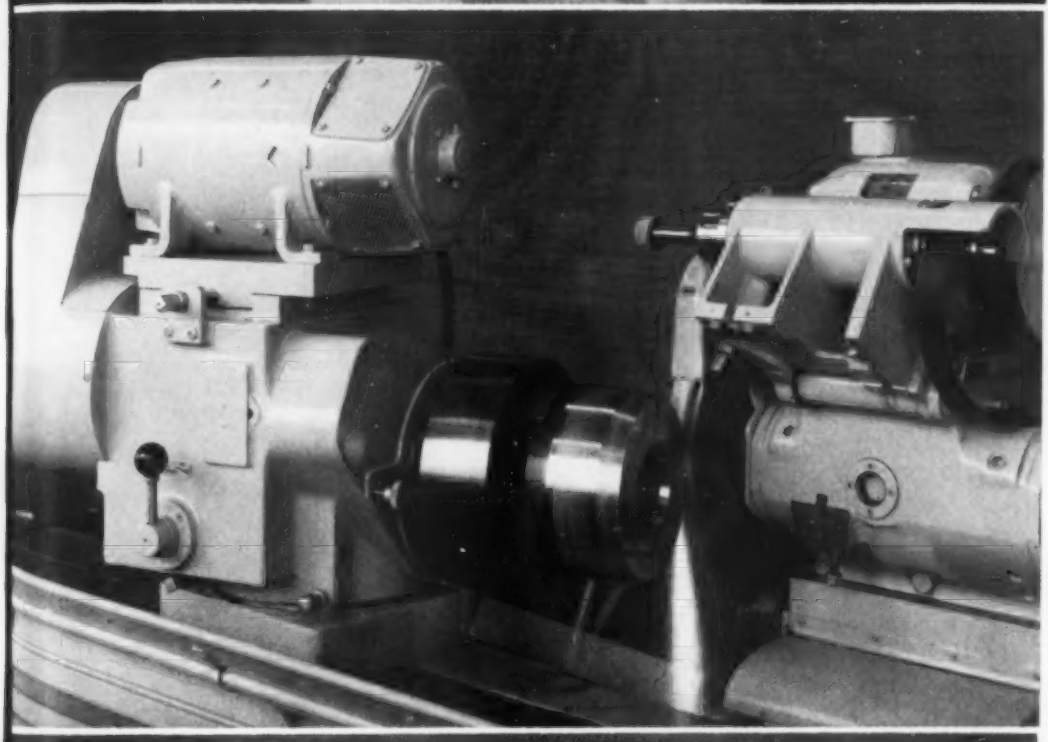
Suppose after grinding the shaft described before, the next job had to be held in a chuck. Changing from centertype to a chucking operation can be done simply by using a standard chuck mounted directly on the headstock without intermediate adapters.

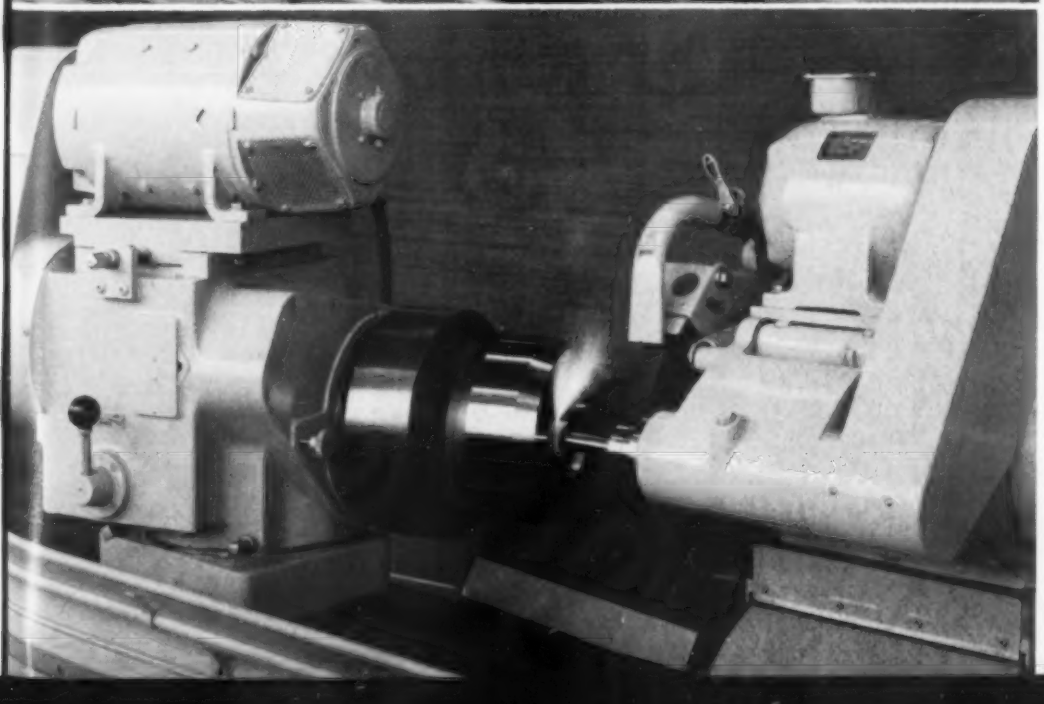
Changes from O.D. to I.D. grinding can also be made very quickly. Without disturbing the set-up, the internal grinding unit is swung down into position. This ability to grind O.D. and I.D. in a single set-up saves time and also provides a high degree of concentricity between the two diameters.

Additional basic points are gages for adjustment of the swivel table to grind to a specific taper or to eliminate taper when grinding straight parts. Sizing attachments and power positioning of the wheelhead are among the more important additional attachments which increase the versatility and fast setup of universal grinders. • • •



traverse grinding | taper grinding | plunge grinding





Quick, accurate set-ups can be made on the universal grinder making it an extremely versatile machine for the toolroom.
O.D. bevel and tapered I.D. of this part are ground without changing the set-up.

Metal removal tests can be made using a carefully weighed sample, grinding for five minutes keeping the grinder moving and using an air line kit to be sure of 90 psi during the test.

For greater profits from PORTABLE TOOLS

By R. ALLCHIN, President • The Rotor Tool Company

Net profits can be increased in the use of portable tools by close evaluation in areas of productivity, testing equipment, air pressure, lubrication, abuse, maintenance, repairs, replacement, and tool selection.

● Productivity of portable tool operators is vitally dependent on the efficiency and exact type of portable tools furnished and also on the air power to drive the tool. Each area to improve productivity has its own simple set of facts which prove the expense will result in greater net profits.

A man receiving $2.40 an hour, working 40 hours a week, has a weekly total payroll of $96.00. If his efficiency is determined by using the tool 40% of the time, the "portable tool payroll" for the man is 40% of $96.00 or $38.40 per week. Per year this means $1920.00 per man or if there are 50 portable tool men, $97,000.00 a year. This is the expense which is dependent on the efficiency of the tools and the air pressure provided your portable tools.

EVALUATION

The first approach to improve portable tool operations is to check the exact condition of the individual tools on the line. A portable tool just purchased starts out at full efficiency, perhaps with more power than is actually needed for the job, but it tends to wear steadily, calling first for routine maintenance and later for major repairs. The difficulty has been estimating the exact condition of the tool. Estimates are often wide of the mark, therefore, a better method must be used to check the power of the tools while they are on the production floor, and measure the extent of repair required before returning the tool to the line.

There is available a Portable Tool Comparator which will indicate the productive capacity of each abrasive tool. This comparator

Application of the Portable Tool Comparator for testing power of new tools, tools on the line and repaired tools, is a simple job on a truely portable device.

This is the white paper test. A film of oil should appear if the oil reservoir is full and the valve or wick is not plugged. Excessive dirt in the line can also be detected.

is easily portable and can be moved out to the operations or used in the maintenance room. The operation is similar to the elaborate Prony Brake used by manufacturers of portable tools. Quick readings, taken at recommended operating speeds of the tool, will provide an exact check of the tool efficiency. Please note: portable tools are designed to operate at 90 lbs. pressure delivered to the tool, testing must be performed with the correct pressure while the tool is under load.

LUBRICATION

Lubrication of the tool should be checked regularly. Lack of lubrication of the tool not only reduces the power delivered but increases the maintenance. Lack of lubrication is probably responsible for at least one third of the normal wear of portable tools.

Oil reservoirs in the tools should be filled regularly. Needle valve operation should be checked by placing a piece of paper over the exhaust. If operating properly, a fine mist of oil will appear on the paper. If line oilers are used, they should be filled regularly.

The number of tools operating with hardly any lubrication is surprising. The solution simply involves direct control of the maintenance man who is made responsible for lubrication. Cost of solution relatively little.

Operating loss in production due to lubrication can be measured by checking a dry tool on a comparator and then lubricating the tool and checking it again. The economics can then be determined by multiplying the percentage gain times cost per week or year as outlined above. The actual losses in production from poor lubrication will vary from plant to plant, but they are always significant. To these costs should be added the additional cost of accelerated wear.

TOOL ABUSE

Abuse to tools such as dropping, use as hammers, etc. can be extremely serious. The extent of abuse varies from plant to plant and from department to department. Correction lies largely in the supervision of foremen and the cost of correcting abuse is almost negligible since it relies solely on the spot attention of the supervisor. It is important to insist upon the supervisor performance to avoid abuse.

MAINTENANCE

Periodic maintenance or preventative maintenance requires the proper facilities. These facilities include a stock of the most commonly used parts, provisions for checking the condition of accessories such as grinding wheels, sanding pads, etc., and proper air conditions for testing. In large plants a regular routine maintenance is performed by a daily or weekly check in and out of tools. Air strainers also must be checked periodically as they tend to load up and thus reduce power.

Effectiveness of routine maintenance can be improved through the use of a power testing technique. The degree of power output change will determine the effectiveness of the repair and determine the need for additional repair or replacement.

Eventually a tool will require major repair cost from $50.00 to $200.00 on tools costing $300.00. To determine the value of major repair versus replacement, an estimate should be made of the savings which are possible through the power increase. Manufacturers repair sheets will prove invaluable in determining the cost of the parts required for major repair. Adding to this the cost of labor for repair will provide the total expenditure. Experience with a few tools which require major repair will provide a background of information

continued

on the possible power increase after major repair.

Do not assume that power increase will be directly related to production increase. This may or may not be true. Portable grinders are designed by all manufacturers with excess power. Some operations require considerable more power than others. Area of contact, type of wheel, type of material and amount of stock removal will vary from job to job, therefore production increases may not parallel exactly the increase in power indicated by the comparator. Many firms prefer to supplement the comparator results with actual metal removal tests.

Many users use 50% of the new machine cost as the maximum figure for repair costs. This figure is questionable. Determining the actual power increase and production gain is a more exacting measure. Costs should also be related to tool design and application development since the purchase of the same type is not always the most advantageous. Costs can be figured in number of weeks required to pay for either the repair or new equipment.

PORTABLE TOOL SELECTION

The original selection of portable tools is usually considered carefully. However, the original purpose is soon obscure. A thorough investigation of portable tool application in the average plant often shows considerable misuse. The entire portable tool industry is continually adding new tools and variations of older types. More efficient tools are constantly available with higher speeds, more power, better cutting accessories, etc. Automation in portable tools appears where production quantities are large.

It becomes quite a job to keep track of all the improvements and to judge their applicability to the individual operations. This decision includes the justification of buying a new tool or repairing the old. For capital equipment these decisions are supervised and studied continually. It is rare to find the same attention devoted to portable tool applications. As indicated at the start of this article the yearly expense of portable tool operations can be considerable.

In each individual application, a time to repay formula can answer the question, "Does it pay to replace the old tool with the right tool for the job?" The following is an actual example.

This particular operation was the chamfering of a plate. Time reduction from the old tool to the new was from 10 to 6 minutes, a 40% reduction. The factor of use for this operation was 50% and the price of the new tool was $310. Actual wage rate was $2.75 per hour and the hours per week were 40. Thus the 40% savings result in dollar savings of $22.00 per week. The new tool paid for itself in 14 weeks. It is difficult to estimate savings, but a reasonable trial in the shop with proper supervision and accessories, will develop figures which management will understand and believe.

The time to repay for portable tools is in most cases less than a year and usually within six months. There are a number of reasons why new and improved tools increase productivity.

1. More power permits heavier cutting pressures or faster cutting.
2. Less weight reduces operator fatigue.

This 6" grinder replaced another grinder by showing a production savings from 10 to 5 minutes, factor of use 50% and a time to repay of 10 weeks.

Replacement by this turbine type pencil grinder cut production time from 10 to 8 minutes with a factor of use of 50% and time to repay was only 9-7 weeks.

A production savings of 40% with factor of use of 50% resulted in this grinder replacing another, repaying the cost of the new tool in 14 weeks.

3. Change in size or type of cutting accessory is possible with increased sfpm.
4. Finish can be improved with increased sfpm.
5. Better feel for the operator due to less vibration, easier control, better balance, lighter weight, etc.

In comparison to machine tools, portable tools can be written off fairly fast and in many ways the operating efficiency of the portable tool operator is much more closely dependent upon the tool itself than in the case of the machine tool. Portable tool operator costs are very nearly as much as machine tool operators. Portable tools can lose their efficiency rather quickly, especially where maintenance is not up to par. Machine tools will do better in this regard but changes for better time are often dependent on increased production, process engineering changes or design changes. All of these involved large expenditures.

In order to show the production savings possible using the right tool for the application, we have taken the averages for a substantial number of case histories. These averages are indicated in number of weeks for write off.

Small Wheel Grinders .....6.7 weeks
Cone Wheel Grinders .....9.7 weeks
Standard Horizontal Grinders .....9.17 weeks

All of these figures are based on the actual factor of use found in the individual cases. Up to this point, we have used a 40% factor of use, however this factor will vary widely in different plants and departments. Managament often considers the use of portable tools to be 100% however even when the factors of use of 75% to 80% are used, we have found them to actually be 40% to 50%. The factor of use thus should be determined by supervision of the department involved.

Actually, portable tool operations are a relatively inefficient part of manufacturing, but a number of steps can be taken to improve the actual cost of these operations. It is unfortunate that accounting does not ordinarily separate the portion of direct labor affected by portable tools. This overall figure is quite often shocking when developed. This figure as suggested by this article will justify aggressive investigation and correction which will lead to greater net profits from portable tool operations.

• • •

THE "TIME TO REPAY" MAY BE SHORTER THAN YOU THINK. HERE'S HOW TO FIGURE IT...

PRESENT TOOL Elec. Right angle Grinder — TIME REQUIRED PER UNIT 3-1/2 MINUTES
ROTOR TOOL M 1132 B -7-8 — TIME REQUIRED PER UNIT 2 MINUTES
SAVINGS 1-1/2 MINUTES
DIVIDE SAVINGS BY PRESENT TIME = 40 % SAVING
Photo 2922-2 — HOW MUCH OF TIME IS TOOL USED? 50% % USE

HOW LONG WILL IT TAKE TO PAY FOR THE NEW TOOL?

PRICE OF NEW ROTOR TOOL $ 310.00 = $ 310 00

40 % SAVING x 50 % USE x $ 2.75 HOURLY RATE x 40 HRS. PER WEEK = $ 22 00

14 WEEKS TO REPAY THE COST OF NEW ROTOR TOOL

SURVEY MADE FOR _____

By ROTOR TOOL COMPANY CLEVELAND 32, OHIO

"Time to Repay" Chart

Special purpose extension grinder with mounted point saved production time by 50%. Factor of use only 25% provided time to repay of 15.2 weeks.

This midget grinder replaced an electric file and hand filing with a 50% increase in production with a factor of use of 75%. Time required to repay cost of new tool was 3.6 weeks.

Automatic surface grinding

● Programming the downfeed increment and the total amount of stock to be removed is the major move needed for completely automatic surface grinding, once the work has been set up on the machine. The operator is then available to run additional machines, or in a toolroom or small job shop, to do bench work. Automatic control of these two adjustments is the function of Incrematic.

Incrematic® is an electromechanical feed mechanism and control that can be programmed by two simple steps beyond those required by a manually-controlled grinding operation. The additional steps are:

1. Dial the amount of stock to be removed.
2. Dial the increments or rate of stock removal.

The first operation can be shown from Figure 2, which is a close-up of the machine shown completely in Figure 1. In the area to the right of the close-up is the downfeed handwheel, which is calibrated. In manual operation, the operator would feed down until the grinding wheel picked up a spark on his work. At this point he would note the handwheel reading and use this calibration to measure the total amount of stock removed.

With the Incrematic, rather than arriving at the final size by a mathematical difference of handwheel readings, he dials directly the total amount of stock to be removed. There are two scales. One, in thousandths of an inch, is continuous around the wheel. The other is a vernier scale with a factor of 10. Hence the amount of stock removal can be dialed easily and directly to an accuracy of a "tenth."

This is accomplished by loosening the two lock screws "A" and "B", turning the graduated portion until the desired reading is obtained, and again locking the two screws. The screws set the finished dimension, the point at which the machine will cease to feed.

Such a setting is retained until the operator changes it. Consequently, in production operation, it is necessary only to raise the wheel sufficiently to clear the next load of parts, and start the cycle again. The machine will automatically seek the final size that was originally dialed into it.

The rate of stock removal is set from the remote control station for the Incrematic (Figure 3). The selector is located just below the pilot light in the center of the panel. Each division on the selector, which is calibrated from 0 to 10, represents a "tenth," and the setting determines the amount the grinding wheel is fed down after each pass over the work area.

When these two settings are made,

Figure 1. Typical toolroom surface grinder, 8" x 24" size.

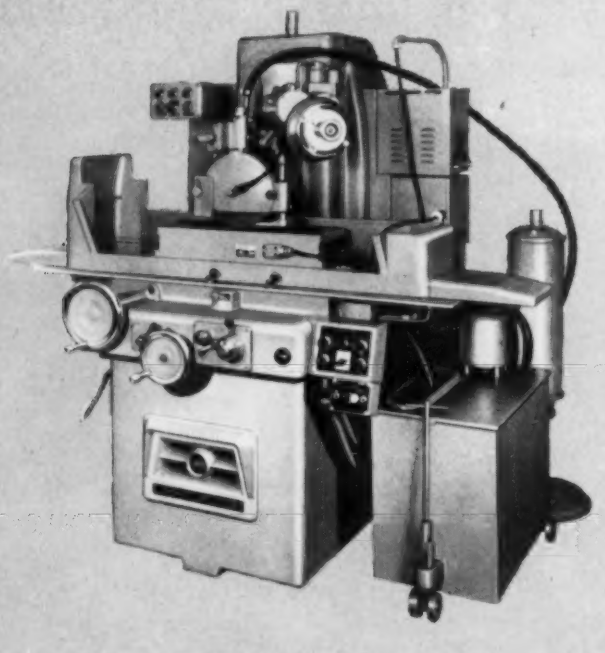
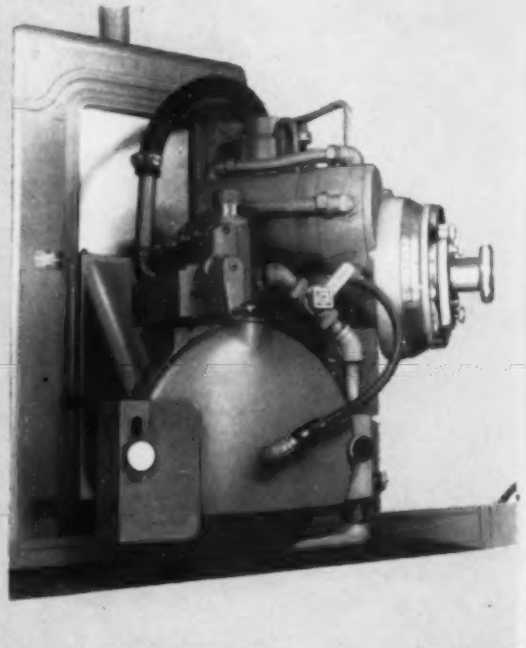


Figure 2. Enlarged view of spindle head and elevating handwheel.



By WILLIAM J. FANT Development Engineer • Gallmeyer & Livingston Co.

made easy

Electromechanical control provides direct dialing of rate and amount of stock removal in surface grinding, frees operators for additional machines, other work.

it is only necessary to push the button and allow the Incrematic to take over.

In operation the Incrematic feeds and the machine removes the pre-set amount of stock per pass until it reaches a dimension .0001″ short of the final dimension, An operator normally leaves a very small amount of stock for a finishing pass and then allows the wheel to make several passes for spark-out.

The Incrematic follows the same pattern. Regardless of the pre-selected rate of stock removal, it leaves .0001″ for the finish pass. Taking the final "tenth" brings the part down to the final dimension. At this point, the grinding wheel makes three passes over the work for spark-out.

When these three passes are complete, the Incrematic automatically stops all motors on the machine and elevates the grinding wheel slightly above the work.

The actual mechanics of the downfeed (Figure 4) involve a small gear reducer motor and an electromagnetic clutch. During the operating cycle, the gear motor is continuously in operation.

The actual feed is accomplished by engaging the magnetic clutch for a pre-set period, determined by a feed rate selector on the remote control unit. Each time there is a signal-to-feed, the clutch engages for a timed period.

The signal-to-feed comes from limit switches actuated by either table reversal or saddle reversal at the option of the operator. From the table reversal this causes a plunge grinding action. From the saddle or cross-travel reversal the signal results in a normal surface grind.

An adjustable timer located on the control panel in the switch compartment of the machine controls the length of time that the magnetic clutch is engaged, and hence the increment of feed.

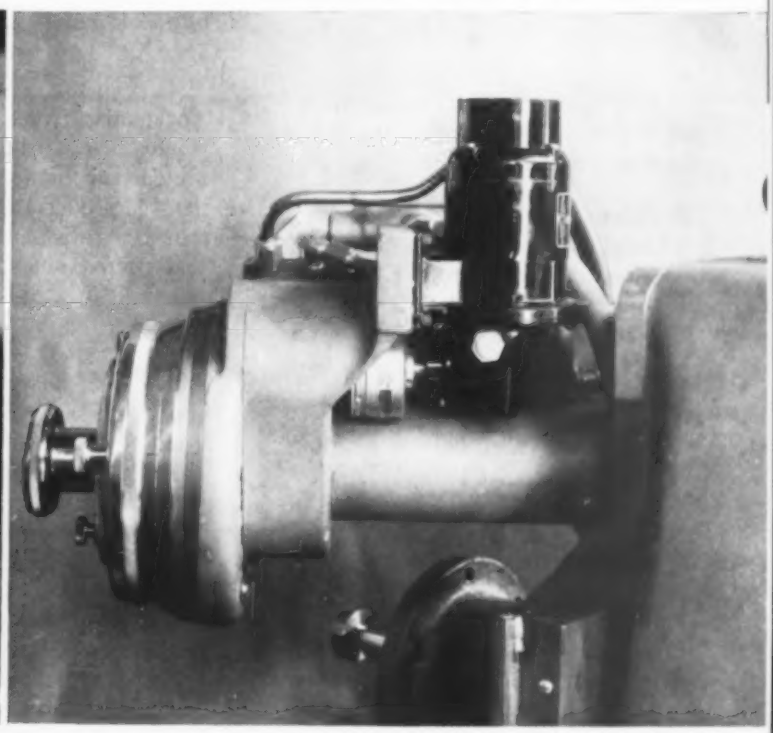
This electric control of the automatic downfeed is far more versatile than previous mechanical or hydraulic devices designed to do a similar job. The ease with which modifications are accomplished for special applications makes it very practical. And it does not interfere with the operation of the surface grinder as a standard manually controlled machine.

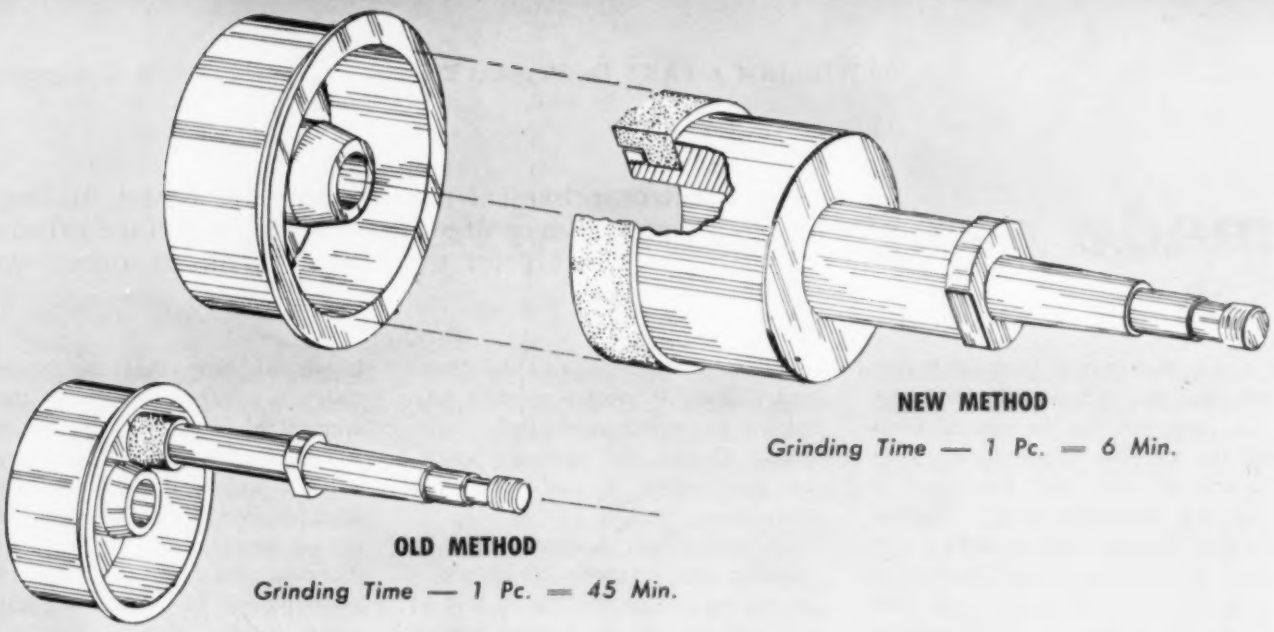
Further, ease of operation and the ability to repeat cycle to extremely accurate dimensions make automatic surface grinding feasible in areas long considered for manual operation. All this has been made possible by electromechanical control. • • •

Article based on a paper presented at the 25th Annual Machine Tool Electrification Forum; sponsored by the Westinghouse Electric Corporation, Pittsburgh Pa.; April 19 and 20, 1961. Used by permission.

Figure 3. Remote control for Incrematic downfeed.

Figure 4. Feed motor and clutch for Incrematic downfeed.





NEW METHOD

Grinding Time — 1 Pc. — 6 Min.

OLD METHOD

Grinding Time — 1 Pc. — 45 Min.

Quill solves internal grind problem

By JOHN WALSH • Process Engineer • Whitin Machine Works

● Internal grinding was the only practicable method of finishing the 3.572/3.570″ ID of the illustrated roll for a nylon draw twister. There was never any doubt about that. The roll rotates at 2500 rpm. It must be balanced, and this internal diameter must be accurate.

With that 1½″ OD hub sticking up 1-13/16″ from the base of the recess, how to grind it was quite another matter.

And we needed 1300 of these rolls for a customer who was losing money on downtime every added day that it took to produce them.

Problem

Grind 3.572/3.570″ ID of 1300 nylon draw twister rolls. Customer's department down. Double-plus rush. Two internal grinders available for operation.

Alternatives

Grind with a straight wheel in a standard internal set-up.

Order special deep cup wheel to clear hub and grind ID.

Fabricate attachment to clear hub; use stock cup wheel.

Evaluation

The largest straight wheel that could be used, because of the hub, was ⅞″ diameter x ⅞″ thick. At 45 minutes per piece, 22 pieces per 8-hour shift, it would require 60 days, without overtime, to complete the order. Too long.

Ordering 3½″ diameter x 2¾″ thick special cup wheels, with a recess 1⅞″ ID by 2″ deep, to clear the hub. Three weeks, best delivery time available, was too long. Most of the grinding would have to be done on the unsupported wall of the wheel, which is undesirable.

An auxiliary wheel mount or quill would have to clear the hub and provide support for the wheel, since the wall around the recess would be thin. This was the only possibility that offered a chance of completing the order in a reasonable time.

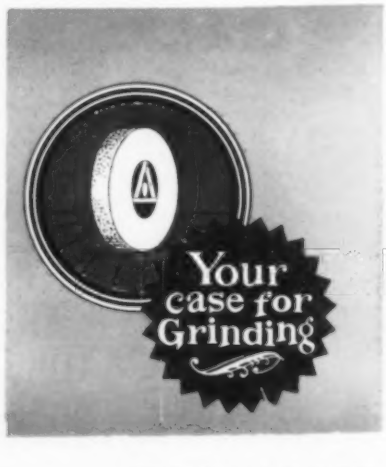
Solution

I had an auxiliary quill (see sketch above) made to fit the quill on the grinding head. It was designed to hold a 3½″ x 1½″ x 2½″ cup wheel with a 2⅞″ x ¾″ recess. The hole was bored from 1″ to 2½″. The wheel was held on the quill by a nut which fit inside the wheel recess. With this design, the piece-part acted as a guard for the wheel, and the quill supported the wheel's grinding surface.

Within a few hours after the design had been completed, we were in production. We had considered plunge grinding, but found that a normal traversing or reciprocating grind was more effective.

The roll is made of AISI C1022 RRA quality killed steel, which is no problem to grind. The 3½″ wheel rotated at 6400 rpm (5500 sfpm), and the piece-part at 150 rpm. Feed at each end of stroke was .0002″.

With the larger wheels having a longer arc of contact with the work, production jumped to 10 per machine per hour, 160 per 8-hour shift. By lengthening the work day to 13 hours, we completed the grinding operation on this order in 6 days. • • •



Watching the "Touch of Gold" come to the surface

Operating a surface grinder equipped with segments of Norton 23 ALUNDUM* abrasive, this man sees production benefits taking actual form. High product quality is just one. Even more important is the free, fast cutting action that steps up both production rate and production economy.

This is how Norton grinding wheels bring the product-improving, cost-cutting "Touch of Gold" right to the surface of every grinding job — so every user can clearly see the advantages he's getting.

Watch "Touch of Gold" benefits taking place in your own plant. Your Norton Man, a trained abrasive specialist, or your Norton Distributor will gladly help you get proof. NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

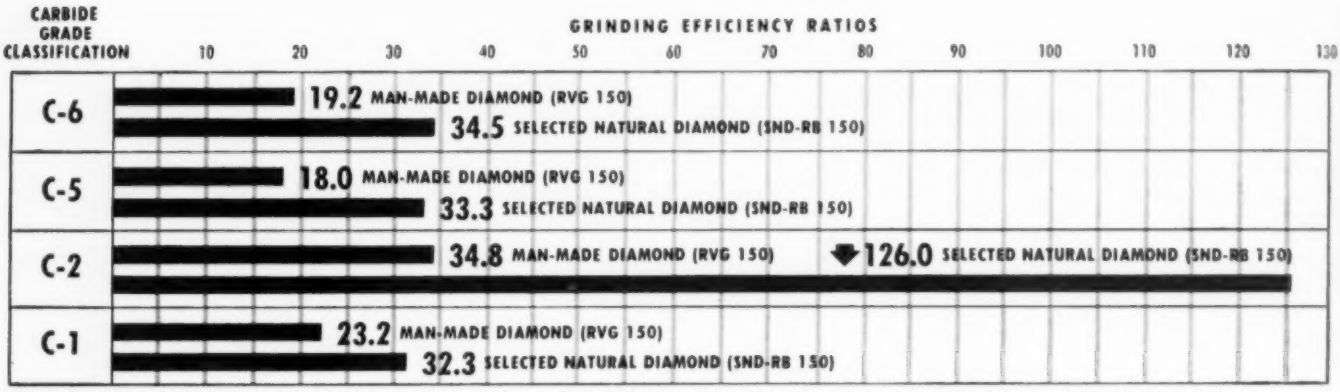
*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

In toughest carbide grinding, SND (Selected Natural Diamond) delivers minimum of 40% longer wheel life!


CARBIDE GRADE CLASSIFICATION
GRINDING EFFICIENCY RATIOS
10 20 30 40 50 60 70 80 90 100 110 120 130
C-6
19.2 MAN-MADE DIAMOND (RVG 150)
34.5 SELECTED NATURAL DIAMOND (SND-RB 150)
C-5
18.0 MAN-MADE DIAMOND (RVG 150)
33.3 SELECTED NATURAL DIAMOND (SND-RB 150)
C-2
34.8 MAN-MADE DIAMOND (RVG 150)
126.0 SELECTED NATURAL DIAMOND (SND-RB 150)
C-1
23.2 MAN-MADE DIAMOND (RVG 150)
32.3 SELECTED NATURAL DIAMOND (SND-RB 150)

TEST CONDITIONS—Wet Grinding • **WHEELS:** DIAI Peripheral (5" x 3/16" x 1 1/4") • **SPINDLE SPEED:** 4200 RPM. (5500 S.F.M.) • **DOWNFEED:** .002" • **CROSSFEED:** .042"

SND (Selected Natural Diamond) outgrinds man-made diamond *on every carbide grade you use*—for unequalled savings in wheel and production costs! The unique performance capabilities of SND—the most advanced development of diamond technology—are demonstrated conclusively by extensive evaluation tests in precision grinding operations.

This chart shows how emphatically SND outscores man-made diamond, even in toughest carbide grinding procedures—grinding with up to *262% greater efficiency on C-2 carbide . . . with 40% greater efficiency on extremely hard C-1 carbide*. These performance results are the reasons why SND can insure longer wheel life, greater wheel output for maximum surface grinding economy.

Discuss SND with your diamond wheel representative. He has the useful experience and information to help you select SND in the diamond wheel best suited for your production requirements.

For information on new developments in precision grinding with industrial diamonds—including test results proving SND superiority—write for Engelhard Hanovia's technical bulletins.

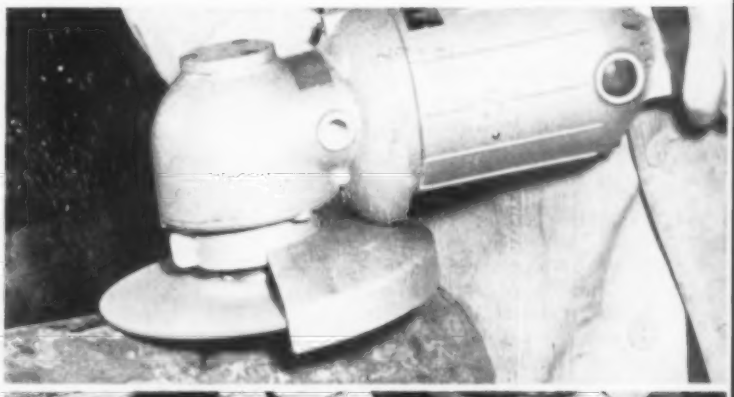
★ENGELHARD HANOVIA, INC.★
INDUSTRIAL DIAMOND DIVISION
113 ASTOR STREET · NEWARK 2, NEW JERSEY

Use postpaid card. Circle No. 229

TYPE 11 OR TYPE 27?

Pick Type 27 for medium or light stock removal, for controlled surfacing, or when light weight or versatility are essential. Pick Type 11 for economy in heavy stock removal on large accessible areas.

By LLOYD H. GILMORE, Engineer, Resinoid Reinforced Products, Cortland Grinding Wheels Corporation.



Type 11 (above) removes heavy stock in addition to blending parting lines on casting. (Rotor Tool Co.)

Type 27 cleans weld metal from welded tooth on repaired gear. (Bay State Abrasive Products Co.)

(Above) Surface cleaning with light stock removal in preparing test piece. (Chicago Wheel & Mfg. Co.)

Medium stock removal could be a toss-up. Weight of Type 27 often vital factor. (Chicago Wheel & Mfg.)

● The success of the Type 27 depressed center reinforced grinding wheel over the last few years has raised questions about its comparison with the Type 11 flaring cup for applications on right-angle portable grinders where either might be used.

There are definite advantages for both types, depending on the specific application and on what the user expects to accomplish. The selection should be based on the nature of the job and the ability of the wheel to do the work efficiently.

The light weight and the versatility of the Type 27 commend it to many operators. This in itself could be enough to tip the scales in its favor in situations where a great variety of work is required. It is more of an all-purpose wheel.

Grooving, notching, and cutting represent a category in which Type 27 wheels are superior because of their shape. These wheels can be obtained in thicknesses of 1/8″, 3/16″, 1/4″ and 3/8″.

General Snagging

Both types can do a satisfactory job of removing metal in general snagging operations.

The Type 11 snagging cup wheel is generally used over large accessible areas where high pressures are necessary to remove substantial amounts of stock. They are more economical in wheel cost versus metal removal.

For medium or light stock removal the Type 27 wheel is very efficient. It is frequently preferred when surfaces are difficult to reach or when grinding in an awkward position.

Blending, Polishing and Controlled Surfacing

For controlled surfacing on irregularly shaped areas and contours, the Type 27 is preferred. Type 27 provides better control of grinding, since the operator has more chance to vary the contact area of the wheel on narrow and small areas.

Type 11 wheels can be used to grind a controlled surface on large, flat areas, but are limited for use on some blending and polishing operations.

Where there is a substantial volume of wheel usage, it may well be to the user's advantage to have an abrasive specialist survey the situation and make a recommendation based on the factors involved in that specific operation. • • •

Literature

Informative reading in abrasive operations for management, engineering, production.

Power Converter

Use postpaid card. Circle No. 1

Four-page brochure describes HiCut electrolytic grinding power converter. Includes explanation of electrolytic grinding, featuring new machine, its available conversions, and a list of 15 metals possible to grind with HiCut. Also details supplies and accessories. Hi-Carb Corporation, 1055 260th St., Cleveland 32, Ohio.

Testing Machines

Use postpaid card. Circle No. 2

A 20-page selected listing of testing machines for all industries is available to technical and purchasing executives. Contains 69 categories of physical testing and covers 461 testing machines. Compiled from world-wide sources and includes price information on all instruments listed. Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N.Y.

Nose-Grinding Fixture

Use postpaid card. Circle No. 3

Four-page brochure offers complete by-the-numbers instruction for sharpening gun drills with the new Eldorado nose grinding fixture. Catalog No. 19. Eldorado Tool and Manufacturing Corporation, 342 Boston Post Road, Milford, Conn.

Formed Wheel Dressing

Use postpaid card. Circle No. 4

An 8-page booklet discusses the Vinco Model B-1 dresser and its various accessories and attachments. Describes several applications and provides a chart for use in ordering the proper sub-base. Vinco Corporation, 9111 Schaefer Hwy., Detroit 28, Michigan.

Plug Gaging Sets

Use postpaid card. Circle No. 5

New tenth plug gaging sets in half-thousandths and thousandths steps are introduced in a 4-page catalog. Includes Talyron chart of a standard production run gage. Deltronic Corp., 929 Baker St., Costa Mesa, California.

Speed Indexer

Use postpaid card. Circle No. 6

Four-page bulletin presents Erickson speed indexer models 400, 450, and 600. Provides detailed specifications and pertinent engineering data. Erickson Tool Co., 34350 Solon Road, Solon, Ohio.

Filter Chambers

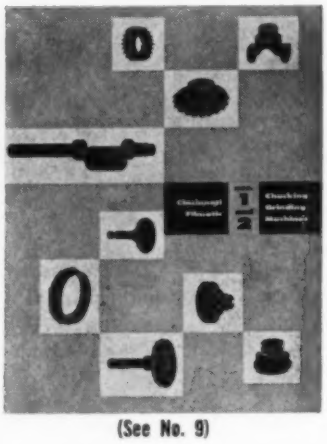
Use postpaid card. Circle No. 7

Bulletin 402 contains complete details and prices on Sethco Manufacturing Corporation's stainless steel type 316 "In-Line" filter chambers for filtering light or heavy fluids to microscopic clarity at pressures to 100 psi. Sethco Mfg. Corp., 2284 Babylon Turnpike, Merrick, Long Island, New York.

Kicker Units

Use postpaid card. Circle No. 8

Air-operated model AK-60 and electric operated Model EK-61 centerless grinder Kickey units are presented in a 4-page brochure. Describes outstanding features of each model and suggested uses. Richter-Klune Engineering Co., 11950 Inglewood Ave., Hawthorne, California.



(See No. 9)

Chucking Grinding Machines

Use postpaid card. Circle No. 9

Cincinnati Filmatic chucking and grinding machines 1 and 2 are presented in catalog No. G-685-1. Includes descriptions, uses, applications of the two units and the work done by their various standard and optional equipment items. Sixteen pages long. Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Universal Plugs

Use postpaid card. Circle No. 10

Bulletin 8009 presents Moore's line of universal plugs, both standard and semi-standard, and includes mounting accessories common to both types. Also discusses the Moore universal plug system, and tells how to order. Moore Products Co., H and Lycoming Streets, Philadelphia 24, Pennsylvania.

Driving Centers

Use postpaid card. Circle No. 11

A new type of driving center produced by Power Grip, Inc., is presented in 4-page Catalog 5036I. Contains complete information on dimensions and instructions for ordering from complete stock of assembled centers and repair parts. Describes three different designs. Power Grip, Inc., Rockfall, Conn.

Diamond Coated Tools

Use postpaid card. Circle No. 12

Dia-Chrome Inc. announces availability of a catalog containing price lists for its new "Standard" line of diamond coated tools. Prices are approximately 25% less than the regular "Heavy Duty" tools. Dia-Chrome Inc., 612 Elk Ave., Glendale 4, California.

Pressure Blasting

Use postpaid card. Circle No. 13

Special report on pressure blasting with manufactured abrasives. Describes areas of application for pressure blasting and various media used. Emphasis is on proper selection and use of aluminum oxide and silicon carbide abrasive. Charts and drawings provide operating information and procedures for popular types of media and equipment. Norton Company, Worcester 6, Massachusetts.

Sharpening Fixture

Use postpaid card. Circle No. 14

Four-page folder describes features of Harig's Air-Flo fixture for sharpening end mills and milling cutters. Includes photographs of various set-ups and accessories, performance charts, and applications. Harig Mfg. Corp., 5751 W. Howard St., Chicago 48, Illinois.

(See No. 14)

(See No. 16)

Live Bin Feeder

Use postpaid card. Circle No. 15

Development, construction details, and outstanding features of the new Live Bin feeder for metering all dry materials are described in a four page illustrated bulletin. Metering rates for solids in various screw sizes of the feeder are tabled from .12 lbs. per hour to 8,400 lbs. per hour and in cubic feet per hour from .003 to 22 with an accuracy of ±1%. Vibra Screw Feeders, Inc., 156 Huron Ave., Clifton, N.J.

Tool Room Grinding

Use postpaid card. Circle No. 16

A 32-page booklet entitled "Tool Room Grinding" contains grinding and sharpening information for tool makers and tool room foremen. Includes data on: grinding wheel markings and symbols; factors governing toolroom wheel selection; types of bonds used in the manufacture of various wheels; and wheel structure. Provides recommendations for wheel selection and use and also discusses sharpening of lathe and planer tools. Macklin Company, Jackson, Mich.

Profile Instrument

Use postpaid card. Circle No. 17

Measuring and recording roundness, flatness, roughness, waviness, scratches, flaws and total surface profiles are described in detail in an 8-page brochure on the Proficorder. Includes many typical profile records and illustrates each of three basic units with descriptions of the function and relationship of each to the complete unit. Micrometal Mfg. Co., 3621 S. State Road, Ann Arbor, Michigan.

Die Grinder

Use postpaid card. Circle No. 18

The new heavy-duty Cleco 125 die grinder manufactured by Cleco Air Tools is described in a 6-page brochure which gives complete descriptions, full specifications, and part numbers for each model. Cleco Air Tools, P.O. Box 2541, Houston 1, Texas.

Portable Equipment

Use postpaid card. Circle No. 19

A new, condensed catalog covering the Dumore line of portable precision grinding tools and small hole drilling equipment contains ordering information and brief descriptive details. Bulletin G-60-C. The Dumore Company, 1300 17th St., Racine, Wisconsin.

(See No. 20)

Semi-Automatic Machines

Use postpaid card. Circle No. 20

A 20-page illustrated catalog describing a complete line of semi-automatic machines for low production deburring, buffing, and polishing operations; and newly developed accessories and attachments for increasing efficiency of semi-automatic finishing operations. Also includes 12 special semi-automatic polishing and buffing machines for specific application requirements. Acme Mfg. Co., 1400 E. Nine Mile Road, Detroit 20, Michigan.

Grinding Vise

Use postpaid card. Circle No. 21

Data sheet describes a new precision grinding vise especially designed to grind square in two planes without removing the part. Unit is accurate, strongly constructed. Toolroom Equipment Division, Producto Machine Company, 990 Housatonic Avenue, Bridgeport 1, Conn.

Vises

Use postpaid card. Circle No. 22

Booklet No. 712 presents descriptions and dimensions for Wilton machinists' vises, combination pipe and bench vises, Torco Bench and Shop King vises, triple duty and utility vises, and Cadet Auto mechanics' vises. Wilton Tool Mfg. Co., Inc., 9525 Irving Park Road, Schiller Park, Ill.

Seven-Inch Grinder

Use postpaid card. Circle No. 23

Bulletin describes the new Delta 7-inch grinder, listing specifications, electrical characteristics of the various single-phase and three-phase motors available with it. Delta Power Tool Division, Rockwell Mfg. Co., 499 N. Lexington Avenue, Pittsburgh 8, Pennsylvania.

Cloth Polishing Wheels

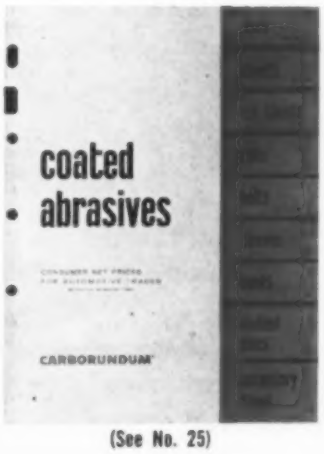
Use postpaid card. Circle No. 24

Condensed, 4-page catalog includes descriptions and specifications of general purpose Clothflex wheels, specially-bonded Superflex wheels and Divine's Non-Streak models. Also covers bushings and balancing tubes for extending wheel life. Divine Brothers Company, 203 Seward Ave., Utica, N.Y.

For Automotive Trades

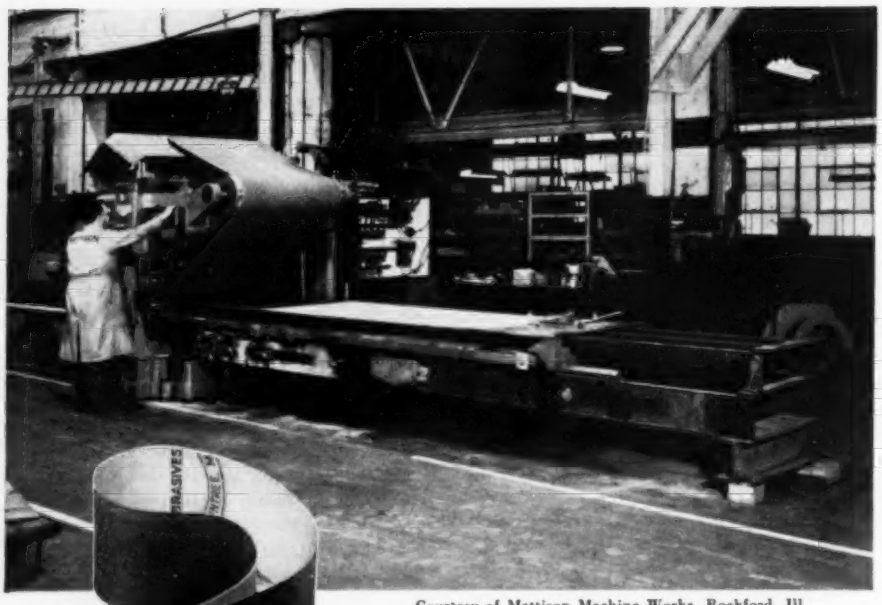
Use postpaid card. Circle No. 25

The Carborundum Company's catalog of coated abrasives for use by the automotive trades is a 20-page listing of discs, sheets, rolls, belts, sleeves, cones, molded discs, and accessories used in the repair of auto bodies. The Carborundum Company, P.O. Box 337, Niagara Falls, New York.

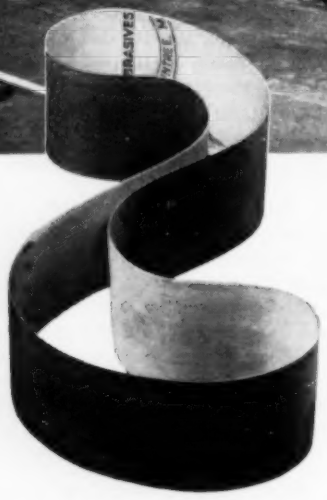


(See No. 25)

for a better finish
and lower grinding cost,
specify Jewel Brand
abrasive belts



Courtesy of Mattison Machine Works, Rockford, Ill.



The Mattison No. 455 Wide-Belt Grinding and Polishing machine utilizes factory coated abrasive belts. It is designed to grind Stainless Steel and alloy sheets.

Today's modern machines are highly developed to produce at highest production speeds with uniform results and minimum costs. But one thing they can't do — they can't choose the right abrasive belt. That's why men who know metalworking specify Jewel Brand. They know, from experience, that Jewel Brand Abrasive Belts are built right to do the job — and do it well.

Why don't you specify Jewel Brand? You'll be assured of getting the right bond, the right backing, the right grain.

For a trial run, call your industrial distributor or write: Abrasive Products, Inc., South Braintree 85, Massachusetts.

JEWEL BRAND

COATED ABRASIVES

belts • rolls • sheets • discs • specialties

Use postpaid card. Circle No. 230

LITERATURE continued

Wheels

Use postpaid card. Circle No. 26

Bulletins ESA-244 and ESA-181 cover depressed center abrasive wheels and green silicon carbide tool grinding wheels. ESA-244 describes Simonds Double XX and Fiber reinforced resinoid bonded wheels for weld grinding and general offhand use. ESA-181 covers Simonds V9 glass type vitrified bond used with green silicon carbide abrasive for this class of work in regular and plate-mounted type wheels. Simonds Abrasive Company, Philadelphia 37, Pennsylvaia.

Flex Drum Abrasive Wheels

Use postpaid card. Circle No. 27

Technical Data sheet No. FD-30 discusses features and applications of the Merit Type B Flex Drum. Lists grade grits available and describes various configurations. Also covers rotation speeds and abrasive loading procedures. Merit Products, 3691 Lenawee Ave., Los Angeles 16, California.

Micrometer Prices

Use postpaid card. Circle No. 28

Two-page price sheet covers entire line of J. T. Slocomb micrometers. Also lists part number and sizes of all Slocomb outside micrometer calipers as well as part numbers of optional features, optional terminals, micrometer head assemblies, and storage cases and racks. J. T. Slocomb Company, 68 Matson Hill Rd., South Glastonbury, Connecticut.

Finishing Recommendations

Use postpaid card. Circle No. 29

A technical data sheet, No. T-2, discusses recommendations for finishing Colmonoy hard-surfacing alloy deposits. Specific grinding wheel recommendations for nickel base, cobalt base, and iron base alloys are presented in tabular form listing 11 different wheel manufacturers. Wall Colmonoy Corporation, 19345 John R. St., Detroit 3, Mich.

Blast Cleaning Machines

Use postpaid card. Circle No. 30

Revised 28-page catalog describes complete line of Wheelabrator Super Tumblast, batch-type airless abrasive blast cleaning machines. Discusses six sizes and provides a section devoted to the Type "M" high capacity abrasive blast unit. Also describes new compensating blow abrasive separators and conventional and automated work handling systems. Catalog 162-D. Wheelabrator Corp., 1169 S. Byrkit St., Mishawaka, Indiana.

Masonry Cutting Equipment

Use postpaid card. Circle No. 31

Catalog EB-112 describes Eveready BrikSaw Company's complete line of masonry and concrete cutting equipment. Also featured is the latest Eveready Blade Recommendation Chart and Blade Comparison Chart. Eveready BrikSaw Company, 1104 Union Avenue, Dept. 547, Kansas City, Mo.

Zirconium Corrosion Resistance

Use postpaid card. Circle No. 32

"The Corrosion Resistance of Zirconium" is a 14-page book containing detailed graphs for more than 100 highly corrosive media. Alphabetical listing of the corrosive media provides ready reference. Compiled from information developed by the nation's leading industrial corrosion testing laboratories. Zirconium Association, 2130 Keith Bldg., Cleveland 15, Ohio.

Surface Grinding

Use postpaid card. Circle No. 33

Norton Company has revised and reprinted its booklet, "The ABC's of Surface Grinding." The 92-page booklet includes general grinding hints, operating hints for each type of surface grinder, information on magnetic chucks, wheel selection information, and hints on trouble shooting. Advertising Dept., Norton Company, Worcester 6, Mass.

Foreign Investment

Twenty-eight page booklet entitled "Private Investment Abroad" discusses the role of private investment abroad, concluding it is a positive factor in domestic employment, the U.S. balance-of-payments position, and the economy as a whole. Price: 50 cents per copy. Machinery and Applied Products Institute, 1200 18th St., N.W., Washington 6, D.C.

"Hurry up with that ammunition!"

OLSON FILTRATION ENGINEERS *Cincinnati 12, Ohio*

OL-17-G

Send complete information on the new Olson "package" coolant filter.

*Name*_____

*Firm Name*_____

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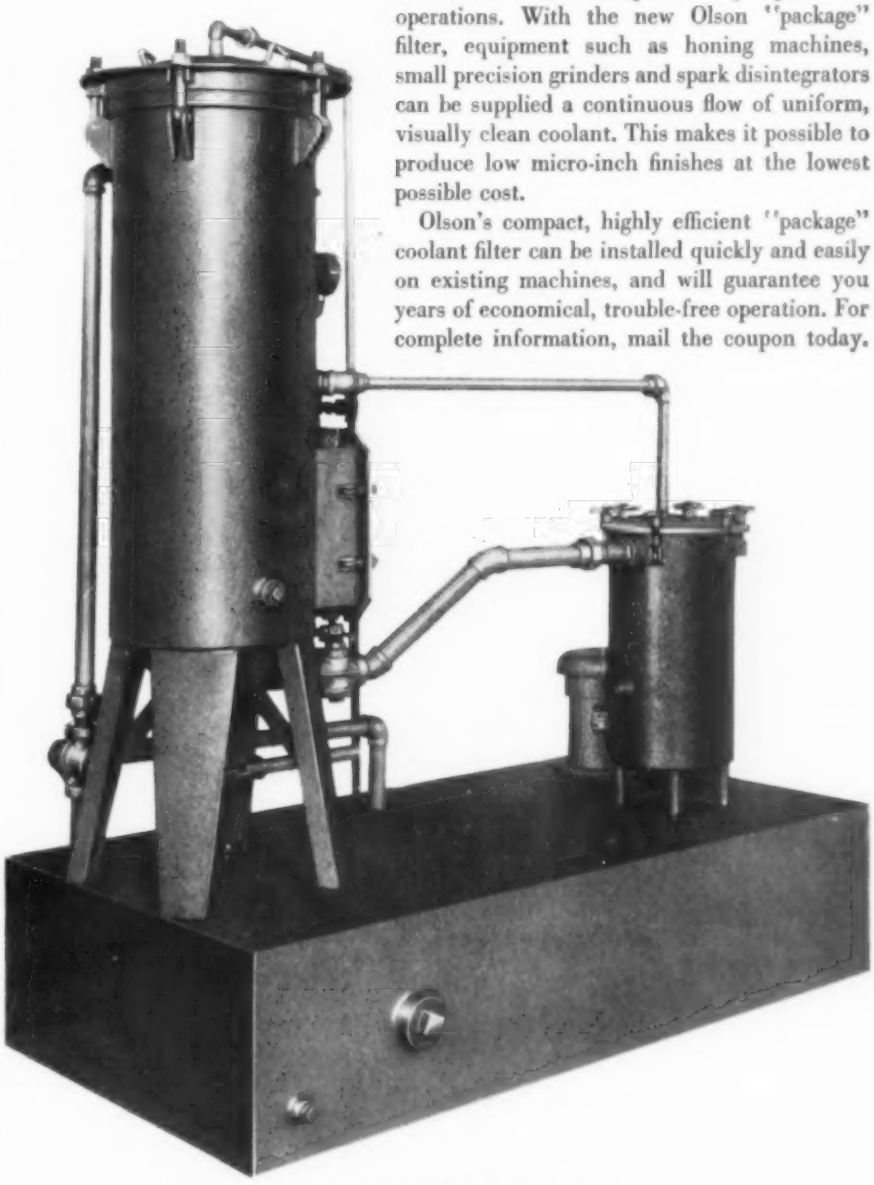
Only from Olson . . .

"PACKAGE" COOLANT FILTERS FOR INDIVIDUAL MACHINES

Now you can lower your cost-per-part even on individual machines performing specialized operations. With the new Olson "package" filter, equipment such as honing machines, small precision grinders and spark disintegrators can be supplied a continuous flow of uniform, visually clean coolant. This makes it possible to produce low micro-inch finishes at the lowest possible cost.

Olson's compact, highly efficient "package" coolant filter can be installed quickly and easily on existing machines, and will guarantee you years of economical, trouble-free operation. For complete information, mail the coupon today.



Use postpaid card. Circle No. 231

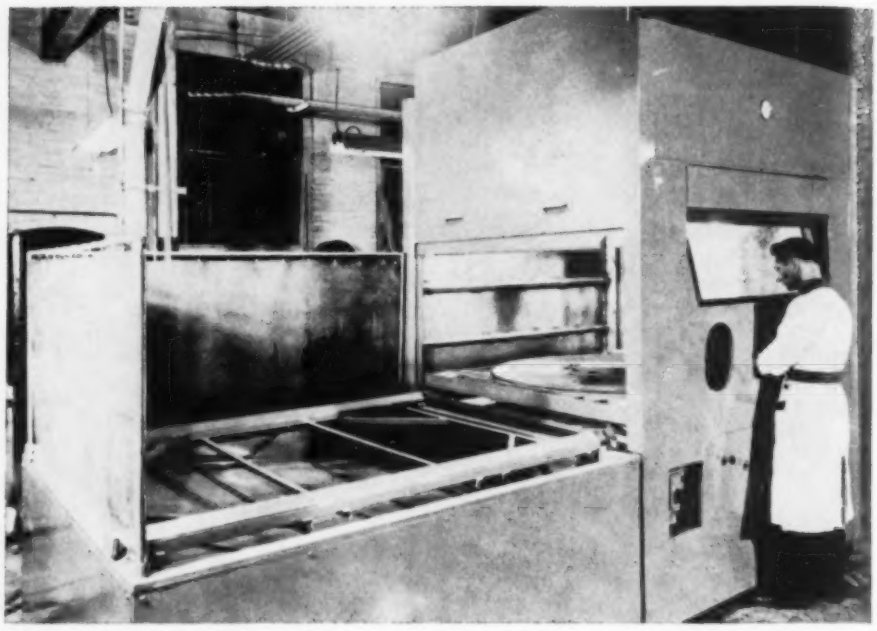
WET BLAST UNIT HANDLES LARGE, HEAVY PARTS

Pressure Blast Manufacturing Company, Inc., has developed a new wet blast unit and work handling device designed specifically for the finishing of large, heavy workpieces.

Measuring 70" wide x 70" deep x 108" high, the cabinet is made of mostly 304L stainless steel. An inverted, pyramidal hopper is furnished within the cabinet for the abrasive-water mixture which is agitated by means of compressed air.

Hopper capacity calls for 50 lbs. of abrasive to 9 gallons of water. Designated Model AA-77, the unit mounts a single manually operated aspiration-type blast gun.

A special attachment, the Rollo-Table, is bolt-attached to the left of cabinet and measures 75" wide x 60" deep and 30" high to the top of the rails. It serves as a work load and unload area and as a rinse area for which a stainless steel rinse tank and rubber splash curtains are furnished.



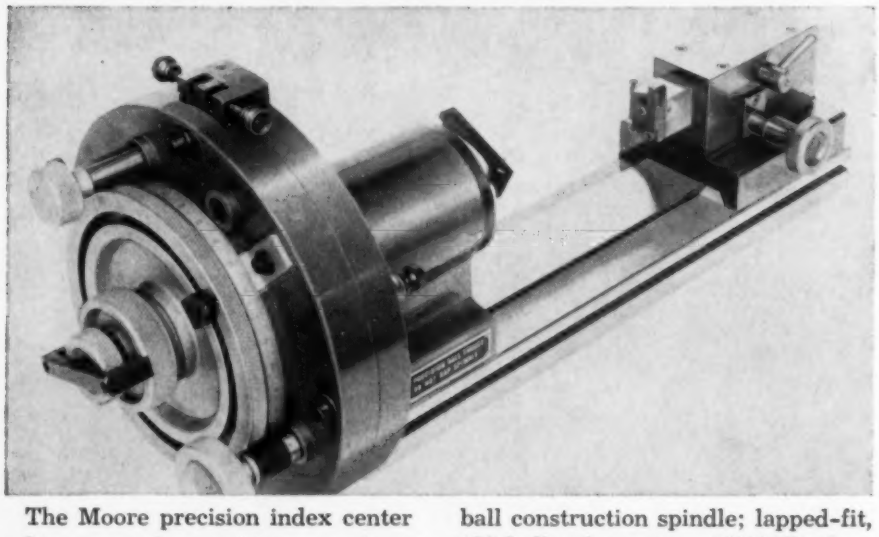
On the inverted angle-iron rails which extend directly into the wet blast cabinet rides a carriage fitted with four machined casters and mounting a rotary work table fabricated of plastisoled expanded metal.

This rotary work table is supported on the outer diameter by sealed bearings and is stressed to accept weights up to 3,000 lbs. No exhaust or permanent drain connection are required for operation of the machine.

Pressure Blast Manufacturing Company, 27 Pleasant Street, Manchester, Conn.

Use postpaid card. Circle No. 48

INDEX CENTER PERFORMS TO ONE-THIRD OF A "TENTH"



The Moore precision index center achieves peak precision on form grinding of spiders, splined punches, gear die punches and dies, and sectional parts of dies, where revolving the part on centers or in a spindle is necessary.

Major features include a special ball construction spindle; lapped-fit, 192 balls plus-minus .000005" tolerance under load; runs true to .000015" T. I. R.; and a lapped carbide plug and four lapped-fit carbide plug-in stations.

Moore Special Tool Company, Inc., Bridgeport 7, Connecticut.

Use postpaid card. Circle No. 47

NEW DEVELOPMENTS IN ABRASIVE GRAINS

The Grinding Wheel Abrasive Division of American Graded Sand Company has announced two important developments in the abrasive grain field—AG 73, a semi-friable abrasive for use in tool room and segmental grinding wheels, and the AGSCO treatment which makes grain extra hydroscopic.

The wet strength of a resinoid bonded wheel—AGSCO treated—is said to be measurably increased over other methods. Grinding wheels manufactured with AGSCO-treated abrasive grain are excellent for cut off, centerless, and other operations where coolants are used.

AG 73 holds true color in all vitrified wheels and is suited for the manufacture of wheels used to grind all types of steel, both hard and soft.

American Graded Sand Company, 2940-50 N. Ashland Ave., Chicago 13, Illinois

Use postpaid card. Circle No. 49

PERMITS CONTINUOUS GAGING CONTROL

With the "Discriminator" continuous gage amplifier, workpieces can actually traverse or rotate under the gaging anvil at high speed and produce accurate machine control signals even though the pieces have holes or steps or the anvil drops off the ends of the workpieces. The electronic gage selects the major dimension only.

The gage can be quickly adapted to any existing surface grinder.

The desired "dwell" and "final size" is simply dialed on the calibrated control knobs on the console. This replaces the usual grinder micrometric index and enables maintaining size consistency within .000050" regardless of wheel wear or dressing.

Electro-Autosizing Machine Corp., 7 William St., Closter, New Jersey.

Use postpaid card. Circle No. 50

HIGH-SPEED GRINDERS ARE COMPACT, LIGHTWEIGHT

The lightweight, high-speed Ingersoll-Rand Series 15 air driven grinders, reduce production time, minimize operator fatigue, and provide easy access to all areas of the workpiece in metal grinding or buffing.

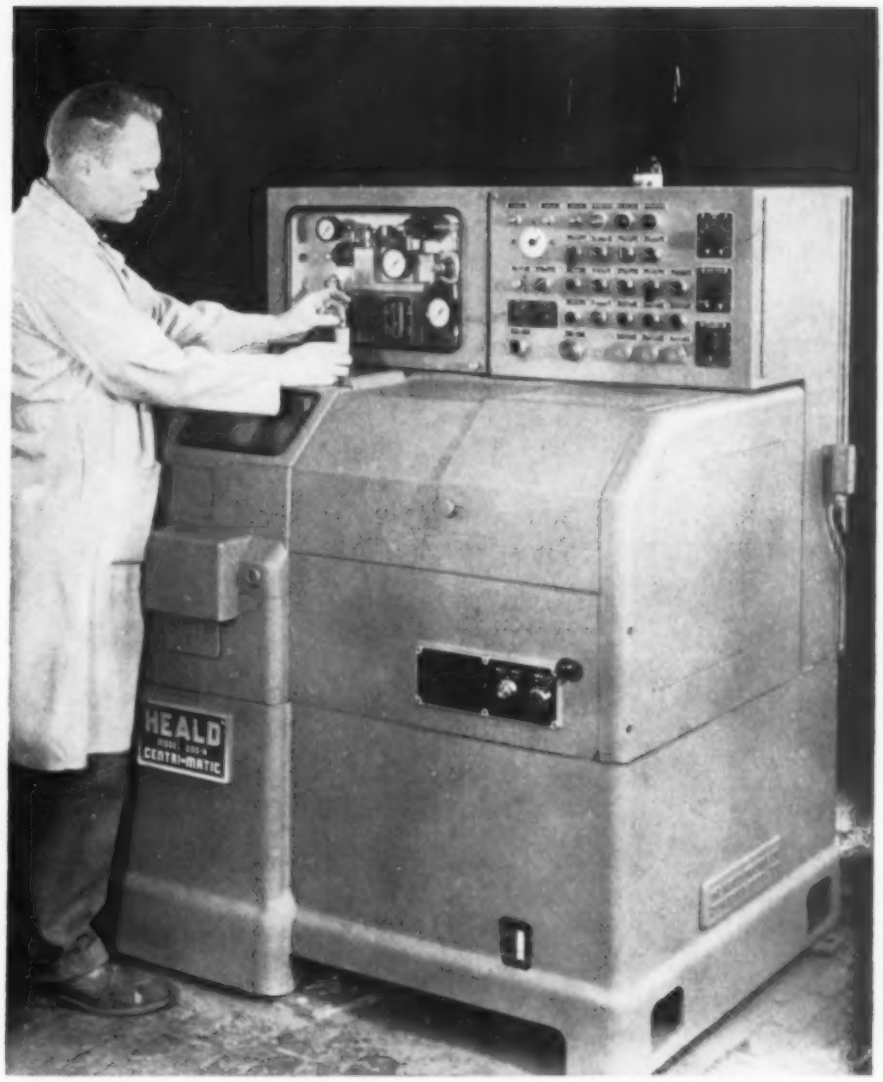
The 12 new grinders measure 16⅝" to 18" long and weigh 6½ to 7¼ lbs. They have free speeds of 6,000, 9,000, 12,000, and 15,000. A choice of grip or straight handles and thumb or lever throttles is available.

Improved muffler design keeps operation quieter, and a sensitive weight-type governor assures positive and accurate speed control.

Ingersoll-Rand Company, 11 Broadway, New York 4, N.Y.

Use postpaid card. Circle No. 51

INTERNAL GRINDER FOR MINIATURE WORK



The Model 090A internal grinder for miniature work has fewer moving parts, lessening the chance of machine troubles. Incremental wheel compensation is infinite in a range from 0 to .001.

The construction of the new vibration damped feeding cross slide on anti-friction ways provides a consistent repeatability well within .00001".

No access is necessary from the ends of the machine and equipment may be placed end-to-end if desired for economy of floor space and operator attention.

A new automatic cycle with facility to swivel both the wheelhead (with respect to its line of traverse) as well as the workhead improves the accuracy of size and taper.

Direct reading micrometer dials on all major 090A adjustments helps reduce changeover time. All cross slide positions can be positively and directly set from data sheets without use of dial indicator setup.

To speed wheel change time the cross slide on the machine resets automatically to the new wheel dress position. A direct reading digital dial shows the amount of wheel life remaining and allows the operator to anticipate the time of new wheel change.

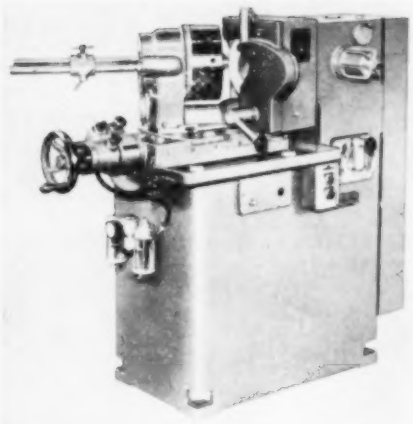
Heald Machine Company, Worcester 6, Mass.

Use postpaid card. Circle No. 52

DRILL POINTER HAS SCROLL-TYPE CHUCK

The Oliver Instrument Company has announced the latest addition to its line of tool room grinding equipment—the Model 600 drill pointing machine.

Available in three styles, the new unit features a scroll-type chuck mounted in anti-friction bearings



and complete with an automatic recirculating system.

The chuck is controlled by a quick acting positive drive which eliminates telescoping universal joints.

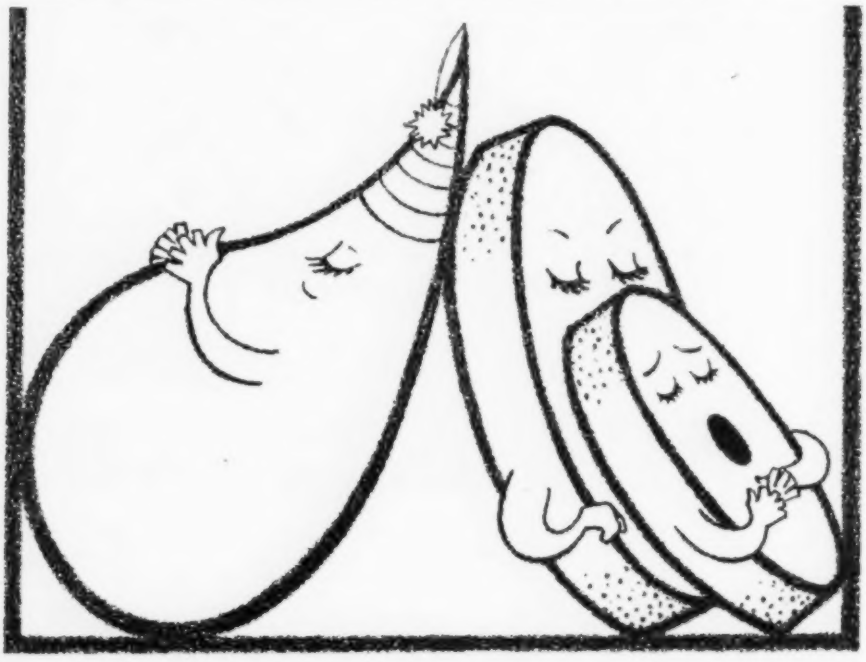
All controls are at the front of the machine. Range of lip clearance has been increased approximately six times over older models, meaning that heavier feeds can be used.

The pointer is available in the dry or wet type and the "Airdraulic" type which is fully automatic after set up.

The unit will grind right hand drills in the 2, 3, or 4 flute style in a size range of ½" to 3" diameters. All flutes are ground in one continuous motion.

Oliver Instrument Co., Adrian, Michigan.

Use postpaid card. Circle No. 53



Is a lazy coolant tiring out your wheels?

Do your grinding wheels loaf on the job, so to speak. Do they require frequent dressing because the coolant doesn't provide keen grinding action?

Do you get slower stock removal than you think you should, yet faster wheel wear — with finishes that are disappointing?

If so, switch to White & Bagley *lively* coolants. There's not an idle drop in a tankful of coolant.

W&B Chemical Concentrates help keep wheels open for fast grinding, minimum dressing, yet cost only about a penny per gallon of coolant.

W&B 1500 is recommended for grinding steel.

W&B E-55 is recommended for grinding steel, cast iron, non-ferrous metals.

W&B Lubricant 1888 gives longer wheel or tool life in grinding OR cutting. A high detergent, oil-type, water soluble concentrate.

W&B HD Soluble Oil 2213 prolongs wheel or tool life on tough jobs — gives heavy-duty support plus superior cooling.

W&B Grinding Oil 1572 sets the pace for the whole industry in critical grinding of threads, forms, gears.

W-B INDUSTRIAL LUBRICANTS

Get the facts about LIVELY coolants, from:
The White & Bagley Co., 88 Foster St., Worcester, Mass.

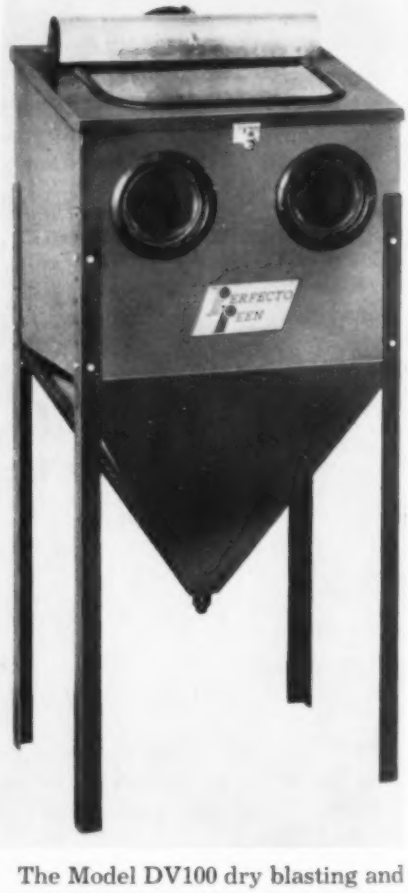
THE WHITE & BAGLEY CO.

Worcester, Massachusetts · Detroit, Michigan

Originators of Grinding Lubricants

Use postpaid card. Circle No. 233

DRY BLASTING AND PEENING MACHINE



The Model DV100 dry blasting and peening machine fills a factory-shop need for a time-saving piece of cleaning and peening equipment at a low price.

Priced at $189.60 (f.o.b. Dallas, Texas), the unit requires air pressure of 60 psi (minimum), 15 cfm. A 1½ hp compressor and a 60-gallon

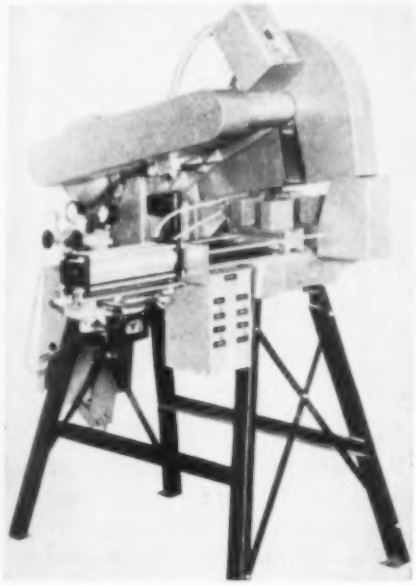
tank are usually adequate for most operations.

It accommodates five to six lbs. of abrasive materials per loading and has a replaceable dust filter. Material life is approximately 25 hours of operating time. Adjustable height of the machine is 52" to 57"; width, 23"; depth (work area), 15"; weight, 100 lbs.; and electrical requirement, 110 vac.

Perfecto-Peen, Aero-Test Equipment, Co., Inc., 8401 Chancellor Row, Dallas, Texas.

Use postpaid card. Circle No. 54

AUTOMATIC, AIR-OPERATED ABRASIVE CUTTING MACHINE



Tubing, extruded shapes, and bars —either ferrous or non-ferrous—are cut to desired lengths automatically, economically, and consistently on the new Beaver No. 14 fully automated abrasive cut-off machine.

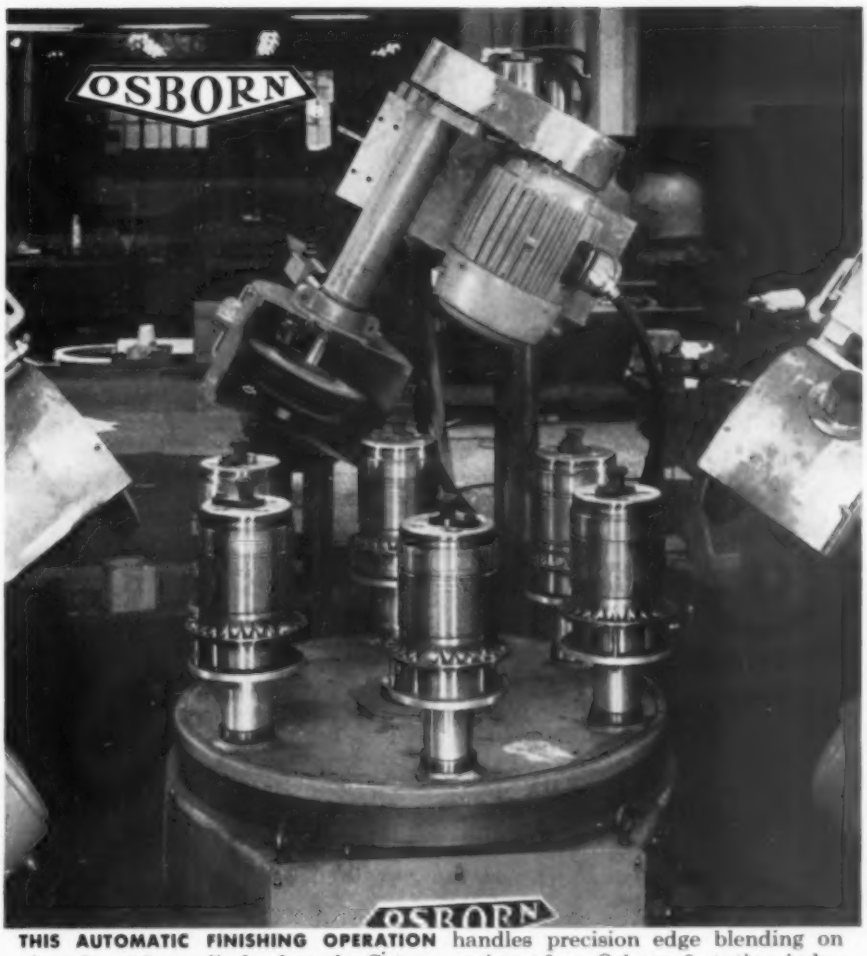
Most shapes up to 3", standard bar lengths, and 1¼" solid stock can be cut with feed strokes from 3/16" to 8". Longer feed strokes can be produced with special adaptations to the machine.

Features of the new unit include a specially designed air vise that holds most shapes within the feed range. It can be set for semi-automatic or completely automatic cycle cutting.

Air pressure control for cutting feed ranges adjusts wheel pressure and prolongs cutting wheel life. Head stop adjustments allow the setup to control the head stroke for a minimum of wasted travel time.

Beaver Pipe Tools, Inc., Warren, Ohio.

Use postpaid card. Circle No. 55



THIS AUTOMATIC FINISHING OPERATION handles precision edge blending on aircraft engine cylinder barrels. Setup consists of an Osborn 6-station index table and three finishing heads equipped with Osborn Fascut® Brushes with deburring compound. Heads No. 1 and 3 each brush one minute clockwise and ccw to put .020" blend on edges of mounting holes. Head No. 2 brushes 1½ minutes cw and ccw to put .010" blend on top edge and O.D. thread ends.

EDGE BLENDING cylinders

done 566% faster with OSBORN power brushing

Here's an aircraft manufacturer with a problem: specifications for these reciprocating engine cylinder barrels called for precision tolerances. Hand finishing rate: 3 parts an hour . . . too slow . . . too costly.

Today, an automatic Osborn Metal Finishing Machine handles the work . . . *power brushing* the parts rapidly, uniformly, economically. Rate: 20 an hour . . . *566% faster with exceptional quality control.*

It's another case-in-point of today's Osborn power brushes and brushing methods at work throughout industry solving tough metal finishing problems. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no obligation—can cut costs on *your* deburring, cleaning, polishing and precision blending operations. Write or call *The Osborn Manufacturing Company, Dept. G-11 Cleveland 14, Ohio. Phone ENdicott 1-1900.*

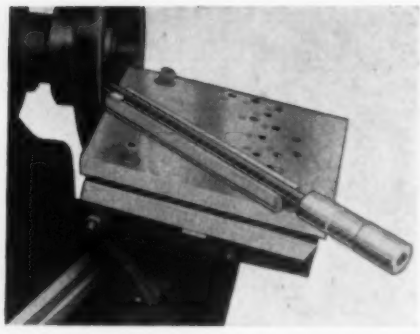
OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

Use postpaid card. Circle No. 234

SIMPLIFIES GRINDING OF GUN DRILL NOSES

Grinding of gun drill noses has been simplified with the development of a new, easily-operated rocker base nose grinding fixture. It may be used on any simple bench or pedestal grinder with a diamond wheel for grinding gun noses to proper sharpness.



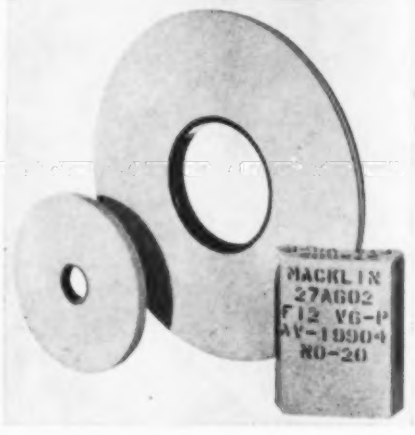
The Eldorado fixture had two parts—a rocker base that is set on the grinder's angle table and a block for holding the gun drills securely on the fixture. The rocker takes care of the traverse for grinding.

Two types of drill holding blocks are available; a micrometer block with micrometer stop accommodates drills from .2500" to 1" diameter; individual blocks for specific sizes of gun drills are available for sizes between .078" through 1" diameter.

Eldorado Tool and Manufacturing Corp., 342 Boston Post Road, Milford, Connecticut.

Use postpaid card. Circle No. 56

FOR HEAVY FEEDS ON VARIETY OF MATERIALS



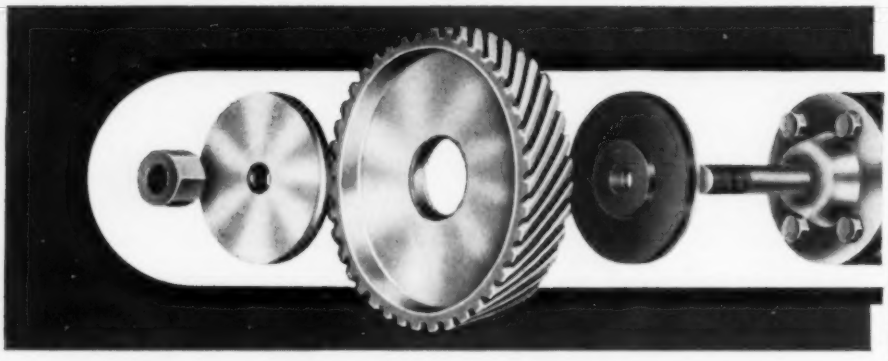
A new aluminum oxide grinding wheel, the 27", can be used for heavy feeds on a variety of materials from high speed steel and regular alloy steels to low carbon steel and boiler plate.

The manufacturer states that the "27" wheel grinds exceptionally cool, gives fast cutting action, and holds form well. In actual tests, it consistently delivered premium grinding results on aircraft parts, crush form applications, and surface grinding operations.

Macklin Company, Jackson, Mich.

Use postpaid card. Circle No. 57

NEW! SELF ALIGNING LOW COST



Cosmo Contact Wheels WITH
COSMO-ALIGNER FLANGES

- ELIMINATES VIBRATION
- QUICK INSTALLATION
- FITS ALL WORN SHAFTS
- INCREASES PRODUCTION
- MOST ECONOMICAL

Your present equipment will operate like new with these self-aligning, low cost, Cosmo-Aligner shaft flanges. They operate with smooth perfect balance on all types of worn shafts. Made of durable rubber cushions, vulcanized to the face of 1/8-inch steel discs. Eliminating vibration will increase the life of your belts and bearings, as well as produce a finer finish for your end product. Call or write today for further information.

R-100 AVAILABLE WHEEL SIZES
Width of Face

Dia.	Flange	1"	1½"	2"	2½"	3"	3½"	4"
6"								
7"								
8"	SHADED AREA INDICATES							
10"	SIZES AVAILABLE							
12"								
14"								
16"								

*Flanges should be ordered with set of wheels.

RECOMMENDED USES FOR R-100 COSMO WHEELS

SIZES DUROS and SERRATIONS TO MEET EVERY GRINDING and FINISHING NEED

R-100-PF — Soft duros for fine finishing in flat work or mild contour work.

R-100-STD — 1 to 1 land to groove ratio. General purpose wheel used in all duros.

R-100-SCOOP — 1 to 3 land to groove ratio. Provides faster cutting and more aggressive stock removal.

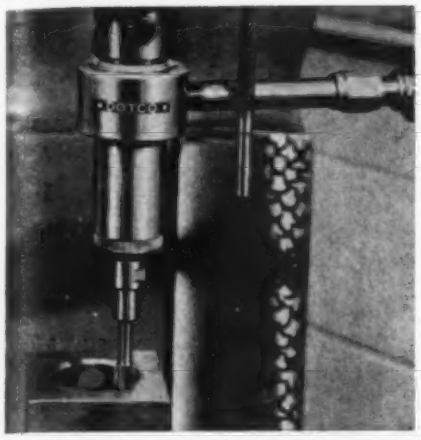
R-100-59 — 1 to 3 land to groove ratio. Deeper serrations, increased flexibility, conforms best to uneven positions.

R-100-E — This is a slotted expanding wheel for bands only.

MANUFACTURED BY CHICAGO RUBBER CO., INC. FOR
Cosmo-Wheels, Inc. 1019 FULTON STREET CHICAGO 7, ILLINOIS

Use postpaid card. Circle No. 235

WILL JIG GRIND ANY SIZE HOLE



Inserted in a boring head or used on a vertical or horizontal mill, boring machine, lathe, or jig borer, Dotco hole grinders will jig grind any size hole as well as male cylindrical members before or after heat treat. The setup is similar to that of other offset boring work with the Dotco hole grinder being substituted for the boring bar.

The maximum hole size that can be ground is limited only by the size of the grinding wheel and amount of offset adjustment of the boring head in which it is used.

Doeden Tool Corp., Hicksville, O.

Use postpaid card. Circle No. 55

DOUBLE-END GRINDING AT ONE CHUCKING

The Bryant double-end internal grinder is specifically designed for grinding both a straight and a tapered bore at a single chucking of a workpiece. Two opposed wheel slides and a rotary indexing worktable carrying two workheads permits two workparts to be ground at once.

The rotary indexing worktable,

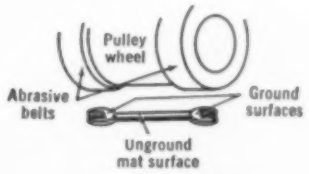
continued

DIFFICULT TO GRIND SURFACES-
NOW A CONTROLLABLE AUTOMATIC OPERATION
THE LOUNGWAY Rise and Fall ABRASIVE BELT GRINDER now has made it possible to replace hand grinding many surfaces on hardware items.

A simple holding fixture made rough and finish grinding of this Plane Lever Cap a completely controllable operation. Automatic grinding improved finish, product quality, and increased production substantially.

Formerly a hand grinding operation, many surfaces of this Hammer Head now have uniform, controlled ground areas in spite of this product's unusual contours.

This open end wrench is ground by using two separate abrasive belts on the same spindle, each grinding a face on an end of the wrench in the same pass. The number of wrenches ground in one cycle depends on wrench size, production requirements, and fixture capacity. Wider tables than standard can be supplied for grinding longer wrenches. On these wider tables, the travel is greater, so the capacity also is enlarged.



We invite you to write for Catalog No. 100 now to learn more about this unique cost and time-saving LOUNGWAY Grinder.

THE EASTERN MACHINE SCREW CORPORATION

61 Barclay St. • New Haven 6, Conn. • STate 7-5724

Use postpaid card. Circle No. 236

supporting the two workheads, is centered between straight bore and taper bore grinding units. Units may be prepared either simultaneously or individually. Machine operation is completely automatic. The operator need only load and unload.

High production features of the new grinder include automatic new wheel dress cycling, compound axial angular slide permitting reciprocal grinding of the tapered bore, and diamond sizing for both straight and taper bore grinding.

Bryant Chucking Grinder Company, Springfield, Vermont.

Use postpaid card. Circle No. 99

SPECIAL DRIVING CENTERS

A line of special driving centers has been engineered to hold tubular workpieces for O.D. turning, grinding, or cutting splines in one operation.

The special driving center has a bull nose center to center large I.D.'s. The driving center is spring-loaded. When pressure is applied to the tail stock, the spring-loaded center retracts, causing the end face of the work to engage the drive pins.

Special centers for tubular work can be made to hold up to 8" I.D. Adapters may be furnished to mount centers on any standard spindle.

PowerGrip, Inc., Rockfall, Conn.

Use postpaid card. Circle No. 59

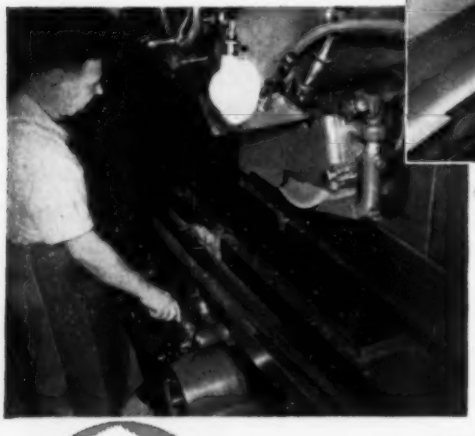
HOW TO CUT SET-UP TIME WITH Sundstrand Magnetic Chucks

Here are two more examples of the profitable application of Sundstrand magnetic chucks to grinding operations. Similar, profitable applications have been made to milling jobs.

No matter how you are holding work pieces now, in grinding and milling, talk to a Sundstrand engineer. There is no obligation for this service.

SET-UP TIME CUT 30%

12"x96" transverse pole magnetic table on vertical spindle grinder holds various sizes of H.S.S. broaching tools at an average savings in set-up time of 30% over former method.



SET-UP TIME CUT 20%

Four 10"x40" POWER-GRIP Chucks on a 24"x96" horizontal spindle surface grinder hold ways, way caps, valve plates, broach holders etc. The four chucks can be operated individually or as one complete unit. Set-up time averages 20% less than previous method.

GET MORE FACTS

Write for further information on holding work for both grinding and milling operations.

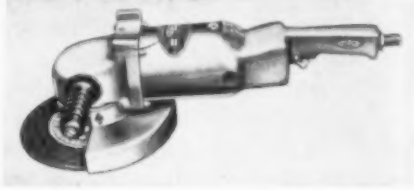
SUNDSTRAND

POWER-GRIP

SUNDSTRAND-AMERICAN BROACH
DIVISION OF SUNDSTRAND CORPORATION
MAGNETIC DEPT. ANN ARBOR, MICH.

Use postpaid card. Circle No. 237

NINE-INCH HEAVY DUTY ELECTRIC GRINDER



The Sioux 1270, nine-inch, heavy duty electric grinder is intended for applications where heavy grinding or sanding of large areas is involved.

It is designed for use with a 6" x 4¾" x 2" flared cup wheel, 9" depressed center wheel, 6" cup wire brush, or 9" sanding disc.

Albertson & Co., Inc., Sioux City, Iowa.

Use postpaid card. Circle No. 60

UNIVERSAL POLISHING, GRINDING MACHINE

The Uni-Pol polisher-grinder is now available to metallurgical and quality control laboratories for fine metallographic specimen preparation.

It is a versatile machine which in-

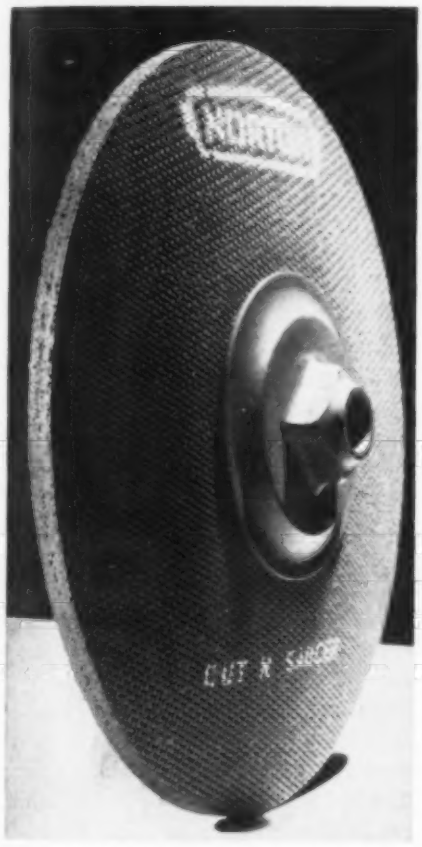
corporates an 80-1200 rpm variable speed control with a powerful semiconductor safeTcircuit ½ hp, d.c. motor providing a constant torque at all loads. The pan, lap, polishing wheel, and cover can be changed as one unit without danger of contamination.

Applications for this machine include semiconductors, ceramics, quartz, metals, and others.

Geoscience Instruments Corporation, 142 Maiden Lane, New York 38, New York.

Use postpaid card. Circle No. 61

FOR WELD GRINDING AND LIGHT SNAGGING



A reinforced grinding wheel for weld grinding and light snagging, the Cut-N-Saucer, combines the advantages of a saucer shaped wheel with the conveniences of a throw-away mount.

The wheels are available in 7" and 9" sizes to fit standard threaded spindles on portable grinding equipment. The saucer shape permits the operator to hold the wheel at a close angle to the work.

The permanently attached Dis-Card mount allows the wheel to be installed on the grinder in seconds. A mounting pad is not required.

Norton Company, Worcester 6, Mass.

Use postpaid card. Circle No. 62

AUTOMATIC LOADER FOR SLENDER PARTS

An automatic device loads, locates, and unloads long slender parts in production machines quicker and easier than an operator could. The device has been designed to prevent jamming or damage of the parts.

Blank workpieces are introduced at the top of an unusual "waterfall" chute that prevents excessive rolling, speed or jamming of the shafts. Each time they go down a step, shafts are slowed and straightened across the chute.

The chute leads to a barrel-shaped escapement mechanism that has four axial slots along its periphery. As the barrel indexes, one part enters the slot and is rotated upward 90° to the load position. The blank is picked up by live-head-and-tail-stock centers and inserted into the machine.

Gear-O-Matic Division, Michigan Tool Co., 7173 E. McNichols Road, Detroit 12, Mich.

Use postpaid card. Circle No. 97

COOLANT REDUCES FRICTIONAL HEAT

Mastercut Premium soluble oil reduces frictional heat during grinding operations. The coolant has pin-point control on both rust and rancidity. A skin cream incorporated into the liquid helps to control bacteria as well as serving as a cleansing agent.

Sulphur and chlorine have been eliminated and no phenols of any kind can be found in Mastercut.

S & S Engineering Co., P. O. Box 158, Northville, Michigan.

Use postpaid card. Circle No. 98

BRING DOWN COSTS

with this TIME SAVING

4-in-1 OPERATION

Simultaneous

BURRING • CLEANING • FINISHING • POLISHING

TIME SAVINGS UP TO 50%

The new concept in abrasive applications, replacing older, costlier finishing methods

The exceptional abrasive-and-rubber working action of multi-use Brightboy will shed a revealing light for you on substantial cost savings. Bridges the gap between the grind and buff in ONE OPERATION. The finish frequently constitutes the final polish. Replaces various older methods for working:

ALL METALS • WOOD • GLASS • FIBERGLASS • LAMINATED MATERIALS • SOME PLASTICS

Immediate delivery JOB-MATCHED STOCK TEXTURES SPECIFICALLY SUITED TO YOUR REQUIREMENTS

Wheels, sticks, rods, blocks and points in wide range of Silicon Carbide and Aluminum Oxide textures—extra fine to extra coarse—in soft, semi-firm, firm and tough rubber binders—for machine and manual operations. The only complete comprehensive line of soft rubber bonded abrasives.

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street Newark 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

Brightboy is breaking cost barriers now for countless users.

TELL US WHERE YOU WANT TO SAVE. WE PROBABLY CAN ADVISE YOU HOW.

Write for the cost-saving Brightboy Catalog-Manual covering:

- Methods and Applications
- Machine Speeds
- Job-Matched Stock Numbers
- Wheel Sizes—Complete Range

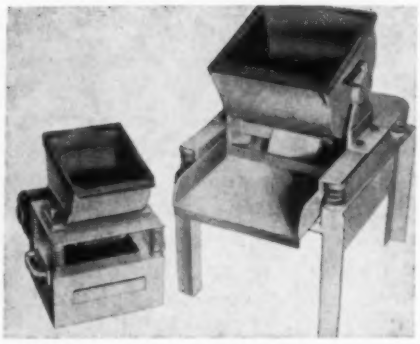
WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

Use postpaid card. Circle No. 238

SMALL VIBRATION DEBURRING UNITS

Two additions recently have been made to Ultramatic Equipment Company's Ferra-Burr line of finishing machines.

The three gallon and one-gallon vibration deburring units make it possible for a shop to do its own finishing of short turn parts. The one-gallon model is designed as a



bench machine. It is portable and does not have to be anchored in position.

Both units are equipped with totally enclosed motors. The larger one swivels and dumps into a receiving pan. The smaller one is emptied by removing it from its mount. Both units will hold their rated capacities during operation.

Ultramatic Equipment Company, 1948 N. Cicero Ave., Chicago, Ill.

Use postpaid card. Circle No. 63

GEARNUT REPLACES SPANNER WRENCHES

Headbloom Products' new Gearnut replaces conventional spanner wrenches and is especially valuable in mounting recessed, cupped, and rubber grinding wheels.

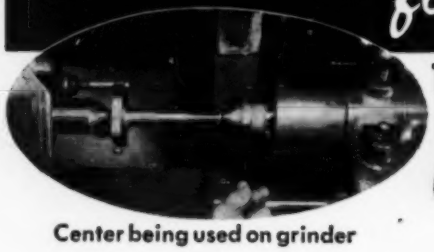
To use, the wheel is placed in position on the spindle, followed by a special washer. The threaded gearnut is started with the fingers and is tightened as required by a key wrench.

Use of the Gearnut helps eliminate abuse of precision spindles and breakage of grinding wheels. They fit all 1¼"-16 right or left hand threaded spindles.

Headbloom Products, Inc., 6827 E. Seven Mile Road, Detroit 34, Mich.

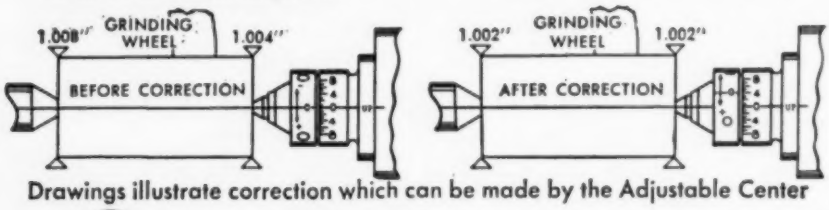
Use postpaid card. Circle No. 64

NEW . . . fast, easy CENTER ALIGNMENT for GRINDERS

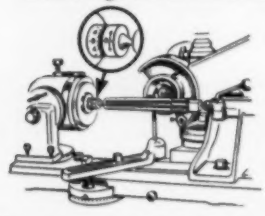


Center being used on grinder

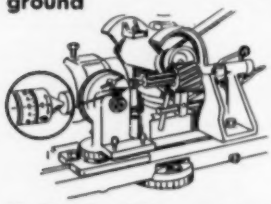
The Enco Micro-Set® Adjustable Center



Drawings illustrate correction which can be made by the Adjustable Center



Taper reamer being ground



Helical milling cutter being reground

- Permits TRUE work alignment from tailstock or headstock on: cylindrical grinders, cutter grinders, gear shavers, lathes and tracer attachments.
- Saves one half the setup time.
- Ends hit or miss table adjustments to obtain precise alignment.
- An inexperienced operator can get a precise alignment—easily—in seconds.
- Quickly pays for itself in time and scrap savings.

MORSE TAPER
No. 2—$49.50, No. 3—$61.50, No. 4—$76.00.

BROWN & SHARPE
No. 6, 7—$53.00, No. 8, 9—$65.00, No. 10, 11—$85.00.

JARNO
No. 6, 7—$53.00, No. 8, 9—$65.00, No. 10, 11, 12—$85.00.

STRAIGHT SHANK
¾"—$56.00, 1"—$68.00, 1¼", 1½"—$80.00.

We also manufacture Precision Lathe Turrets and Tiny-Titan Magnet Base Holders.

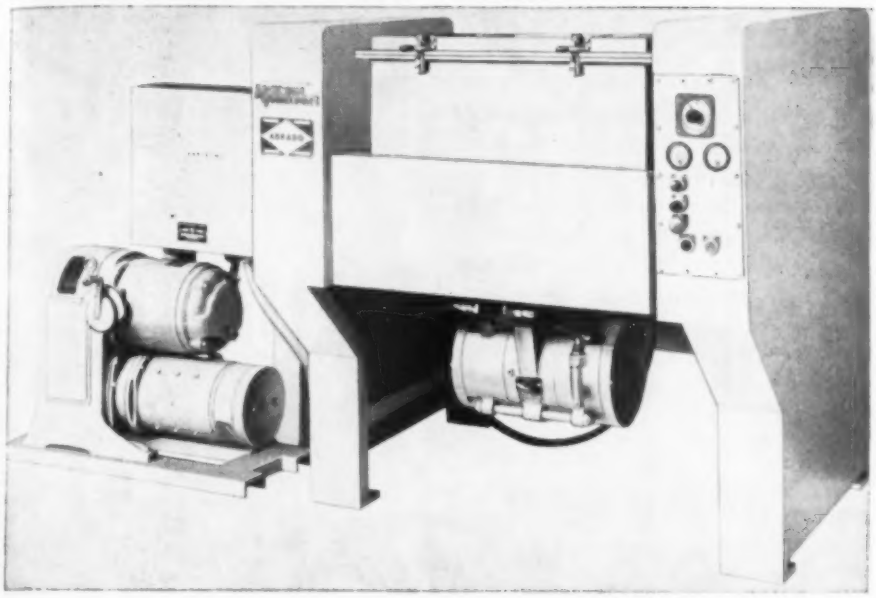
Enco MANUFACTURING CO. Dept. 871, 4520 W. Fullerton Ave., Chicago 39, Ill.

Write for catalog and nearest distributor.

Use postpaid card. Circle No. 239

"Look at that beautiful diamond swarf. Why don't you go into the grinding business?"

ANNOUNCE VIBRATORY METAL FINISHER



Jackson Vibrators, Inc., has introduced the Jackson Vibrado, a new line of vibratory finishing machine, in sizes from 1/10 to 20 cu. ft. capacities.

The new finishers feature full radius roll-over tub design, compact cut-back housing design, full 180° tilt for easy unloading, and controlled orbital flow pattern with synchronous vibration to provide improved finishing at greatest speed.

Vibrados require no special flooring for installation and operate quietly when mounted directly to the plant floor.

Jackson Vibrators, Inc., Ludington, Michigan.

Use postpaid card. Circle No. 65

ALL-EPOXY CENTRIFUGAL FILTER SYSTEMS

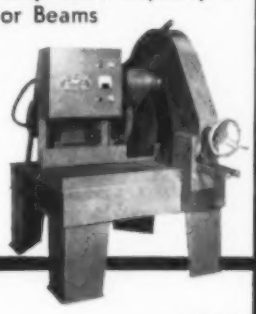
Sethco Manufacturing Corp. has introduced a new all-epoxy centrifugal filter system series with capacities from 300 to 2700 gallons per hour.

Designated the AAI series and designed for depth filtration of all the common acid and alkaline electroplating baths including pyrophosphate, fluoborate, and high chloride to microscopic clarity, these portable filters feature all-epoxy construction which has chemical and heat resistance to 250° F.

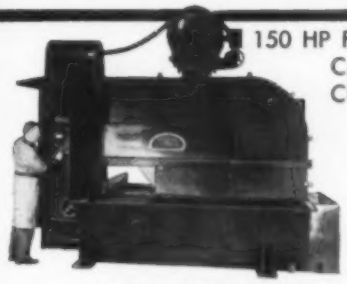
continued

Ty-Sa-Man America's Most Complete Line of Industrial Sawing Machinery

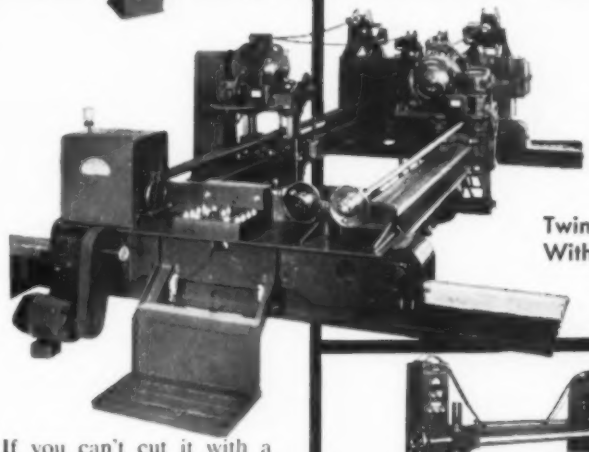
30 HP Chop Saw, Capacity 8" Rounds or Beams



150 HP Friction Saw Capacity 24" Channel

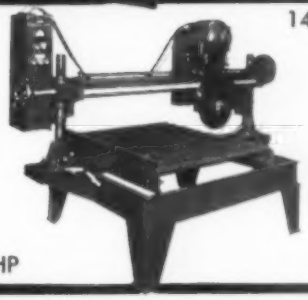


75 & 40 HP Model Available



Twin 40 HP Gantry With 90° Heads

144 DB Saw for Plate



15 HP

If you can't cut it with a standard saw . . . call us! Ty-Sa-Man has built thousands of special and standard saws, one of which may solve your problem. If not, our engineering staff is at your disposal.

TY-SA-MAN Machine Co., Inc.
1016 White Ave.
Knoxville, Tenn.

Write Today for Free Brochure

A brochure pictures and describes the functions of many metal saws. If you have a cutting problem, write or call today.

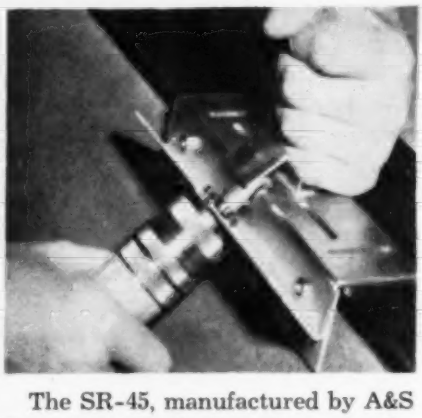
Use postpaid card. Circle No. 240

The filter chamber can be completely disassembled for thorough cleaning and filter tube replacement in a short time. Optional modifications in materials of construction permit this unit to be used for any corrosive solution at operating temperature to 250° F.

Sethco Manufacturing Corp., 2284 Babylon Turnpike, Merrick, Long Island, New York.

Use postpaid card. Circle No. 67

UNIVERSAL EDGE FINISHING GUIDE



The SR-45, manufactured by A&S Production Tools, Inc., is an attachment for their Adjusto-Guide which simplifies edge finishing operations. Top face of the guide is slotted to allow adjustment of rollers for conforming to variation of radii to be ground. The side plate is adjustable for clearance.

The SR-45, in conjunction with various portable tools, can be used on all types of materials both soft and hard. Uniform chamfers can be quickly ground or machined on both straight and curved edges.

A&S Production Tools, Inc., Worcester, Mass.

Use postpaid card. Circle No. 68

"Here's that magnetic chuck you wanted, Boss."

Dependability

diamond wheels by

THE PAUL L. KUZMICK CO.
271-279 GROVE AVE.
VERONA, N. J.

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NEW REPRINTS

Latest in a long series of GRINDING and FINISHING reprints is a 16-page collection of the five articles on the

STANDARD MARKING SYSTEM.

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Quality

diamond wheels by

THE PAUL L. KUZMICK CO.
271-279 GROVE AVE.
VERONA, N. J.

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Performance

diamond wheels by

THE PAUL L. KUZMICK CO.
271-279 GROVE AVE.
VERONA, N. J.

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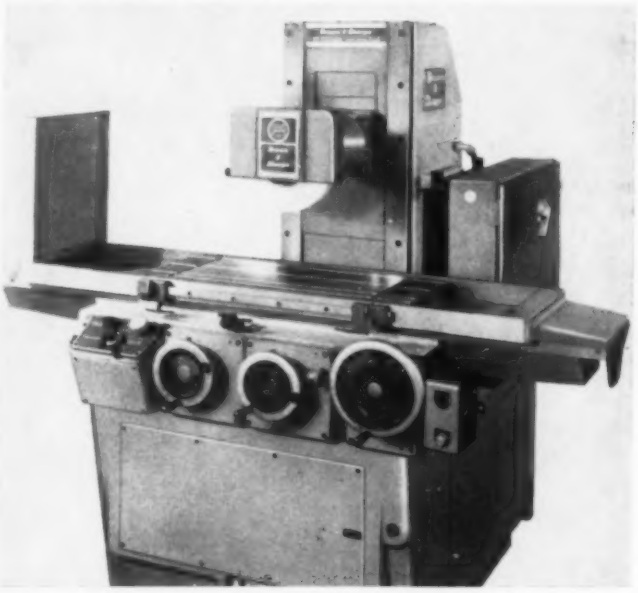
SURFACE GRINDER SPECIFICALLY DESIGNED FOR USE IN TOOL AND DIE SHOPS



A new 12"x24" surface grinder has been added to the machines. This new unit was specifically designed for use in tool and die shops where its table, which is wide in proportion to its length, can perform highly accurate die grinding.

The machine is also suited for general production work due to its fully automatic operation by the addition of an automatic slot and surface grinding attachment, a wet grinding attachment, and a vertical position indicator attachment.

Powered by a 5 hp direct drive motor, the unit is furnished with a massive anti-friction, permanently-lubricated spindle. The spindle is flange-mounted, allowing extremely accurate slot or shoulder grinding.

The spindle upright moves on its own V and flat way transversely, while the table is also mounted on a separate V and flat way for longitudinal movement. Automatic lubrication to all bearing surfaces is furnished by a separate system.

Brown & Sharpe Manufacturing Company, Providence 1, Rhode Island.

Use postpaid card. Circle No. 69

NEW HIGH PERFORMANCE CUT-OFF WHEELS

Described as a major improvement in cut-off grinding wheels, a new type wheel has been released by Peninsular Grinding Wheel Company. Field testing prior to the release included cutting off of tubular and solid aluminum, steel, cast iron, nickel, brass, bronze, and Stellite.

The high performance of the wheel is due to a formulation which includes a new bonding agent and a new additive which produce freer cutting, less burning, and freedom from burrs.

The new bonding agent, "66 Bond," in the wheels also resists deterioration by water vapor and coolant.

Peninsular Grinding Wheel Company, 729 Meldrum Avenue, Detroit 7, Michigan.

Use postpaid card. Circle No. 70

Now New Concept

in

GRINDING WHEELS

AGRABOND

a combination resilient rubber-bond wheel having the metal removal qualities of a rigid resinoid wheel and the finishing properties of a flexible polishing wheel.

Write for new literature today!

PEKAY ABRASIVES, INC.

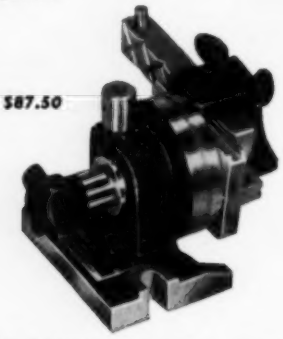
271 Grove Ave., Verona, N. J.

Use postpaid card. Circle No. 245

Angle Tangent to Radius WHEEL DRESSING Simplified WITH ROTHFUSS TOOLS

THE G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on all wheels up to 10" and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. *Price $80.50*

Price $87.50



THE G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up jobs to be milled, drilled, tapped on any desired angle.

FREE **STORAGE CASE** of light-weight steel, with a hinged top, heavy duty latch and a blocked interior to insure the safety of the dressers when carried.

OUR FIXTURES will dress most radii and angles tangent each other, similar to those shown below.

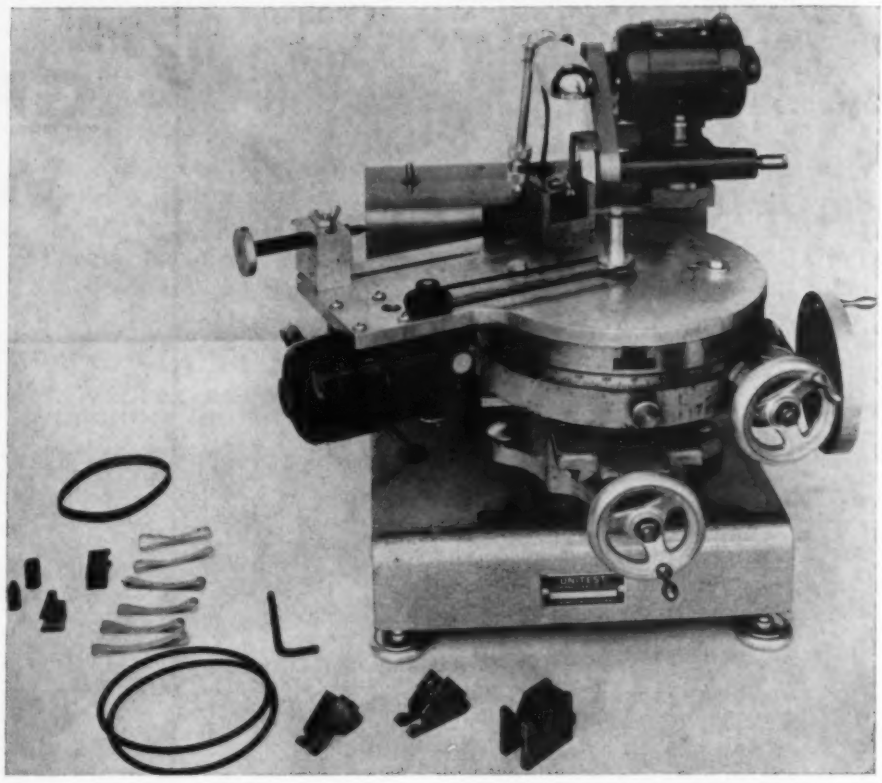
All for only **$149.50** *(including case and both tools with diamonds)*

Distributorship available in select territories

ROTHFUSS TOOL COMPANY
BOX 2696 ELMWOOD STATION PROVIDENCE 7, R. I.

Use postpaid card. Circle No. 246

V-BLOCK FIXTURE BROADENS GRINDER'S WORK RANGE



Developed primarily for the precision grinding of Diesel fuel pump and injector parts, the Model U-800-A Unitest universal grinder is now available with V-block fixtures to grind laps or stems from ⅛" to ⅝" diameter and from ⅝" to 9" in length.

Using cast iron, stainless steel, or stone lapping arbors turning at 10,000 rpm, the grinder features both grinding wheel and quill drives assembled to the fixed or movable beds of the tool, belt driven by separate motors.

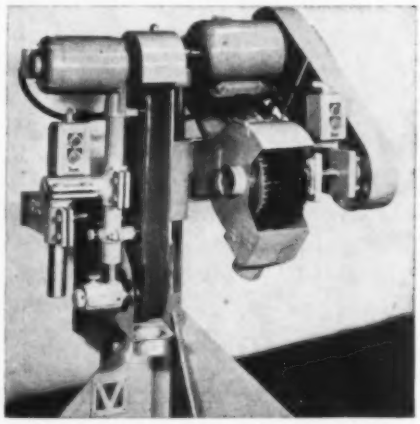
The quill drive is powered by a speed reducer motor, the belt of which rotates the part being ground. Rotation of the table for proper angular setting is by a vernier handwheel graduated in increments of 3 minutes.

Smooth and vibrationless travel of the heavy cast iron table, on the cross slides, is aided by a flywheel that is part of the traverse handwheel. Versatility of the unit permits a range of grinding angles from absolute parallel to a maximum of 160° included angle.

Marine Pumps, Inc., Division of Diesel Control Corporation, Wilmington, Calif.

Use postpaid card. Circle No. 71

COMBINATION GRINDING AND FINISHING MACHINE



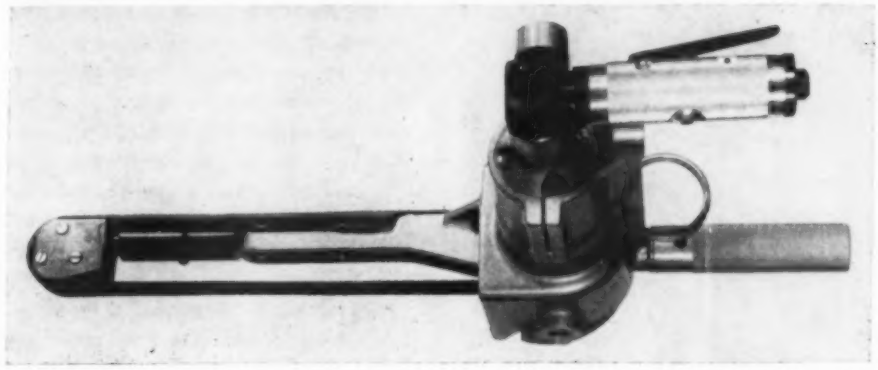
A combination grinding and finishing machine is an extremely adaptable unit which features a 2 hp abrasive belt grinder with contact wheel and platen for quick stock removal and a Vonnegut brush-backed polishing head for smoothing and blending to proper finish.

Universal adjustment of the belt unit permits tilting to grind on the contact wheel and the polishing head has variable speed drive to properly accommodate various types of materials.

Grinding and Polishing Machinery Corp., 2530 Winthrop Avenue, Indianapolis 5, Ind.

Use postpaid card. Circle No. 72

FINISHES INSIDE CONTOURS ON DIE CASTINGS



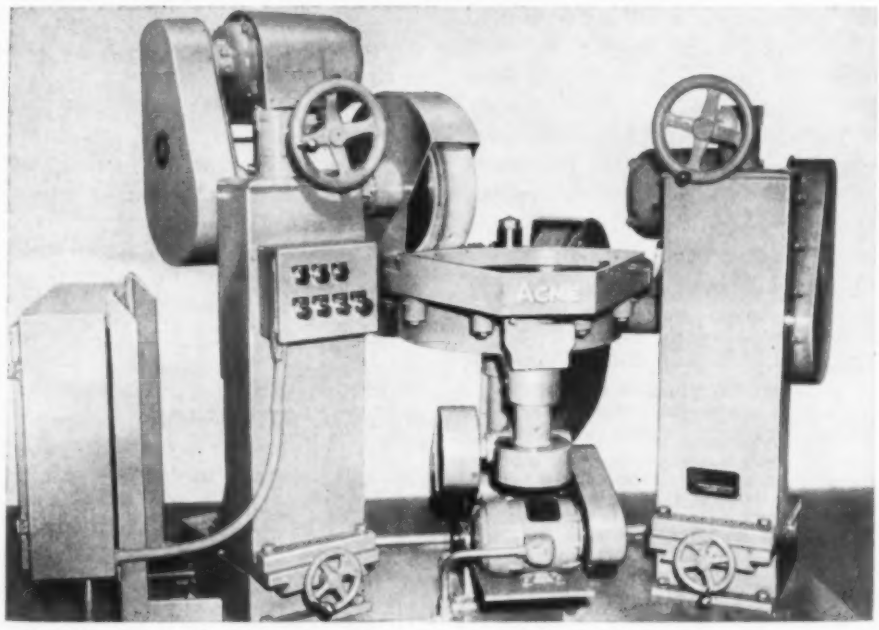
The Rotor Tool Company's new Saber belt sander is specially designed to finish and edge blend inside contours on die castings. It permits the operator to reach inside edge areas previously accessible only with smaller grinders and finishers.

The Saber has a speed of 6200 fpm. Belt support casting is high tensile strength aluminum. Pulley diameter is 2" with a center distance of 13⅝" between pulleys. The unit is equipped with a positive belt tracking adjustment, with a spring loaded maximum belt tension of 40 pounds. It uses 1" to 2" wide belts.

Rotor Tool Co., Cleveland, Ohio.

Use postpaid card. Circle No. 73

AUTOMATICALLY CHAMFERS HELICAL SPRINGS



A self-contained machine tool consisting of a rotating friction drive work fixture and two adjustable grinding lathes mounted on a common base automatically chamfers the top and bottom edges of helical steel springs.

Springs to be chamfered are manually loaded into retainer pockets in the work fixture and are continuously rotated through the grinding wheel chamfering stations. They automatically eject from the work fixture following the chamfering operation.

The friction drive arrangement also acts as a safety and eliminates the possibility of damage in the event a spring jam-up occurs.

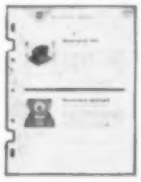
The faces of both grinding wheels that perform the chamfering operations are contoured to the machine radius. Thus each grinding operation automatically dresses the grinding wheel and eliminates the need of manual wheel dressing. Each wheel can be manually adjusted vertically or horizontally to compensate for wheel wear.

The unit occupies a floor space of approximately 3' x 5' and is about 4' in height.

Acme Manufacturing Company, 1400 East Nine Mile Road, Detroit 20, Mich.

Use postpaid card. Circle No. 74

Send catalog page D-100 and name of nearest distributor.



Name

Title

Company

Street

City/State

2 NEW DRESSERS

Desmond MP Dresser
for mounted points and wheels

For tool and die work—anywhere you use a hand grinder. Bolt the inexpensive Desmond MP Dresser to your bench. Put the worn point in the grinder, press the switch and hold the abrasive point on the hardened steel dresser cutters. Instantly you restore the shape, renew the cutting action to its gritty best. Saves time replacing dull points and wheels. Ups grinding efficiency nearly ⅔. Lets you shape your own points from blanks. $5.25 from your Desmond distributor.

Desmond Duplex Dresser
for portable hand grinders.

Now you can quickly dress and true grinding wheels on flexible shaft and other portable grinders. Bolt Desmond Duplex to bench. Cradle revolving wheel between the two cutter heads. Removes load, exposes sharp abrasive grains. $8.75 from your Desmond distributor.

Desmond

THE DESMOND-STEPHAN MFG. CO.
URBANA, OHIO

Use postpaid card. Circle No. 249

If you want to get a personal copy of GRINDING and FINISHING regularly . . .

GRINDING and FINISHING is regularly distributed to qualified users of abrasives at their company addresses.

The magazine is also available on subscription to anyone interested, user or not, as explained below. (Supplier member of the American Society for Abrasives may subscribe at a special rate of $4.50 per year.)

LOOKING AHEAD TO AUGUST

The following are several of many timely features which will appear in the August issue:

- Jig Grinding Applications and Potential
- Power Brushes for Gear Finishing
- Belts Grind Continuous Welded Rail

GRINDING and FINISHING
Hitchcock Building, Wheaton, Illinois

Domestic:
☐ 1 year (12 issues) .....$ 6.00
☐ 2 years (24 issues) $12.00

Canadian and Foreign:
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☐ Check enclosed ☐ Bill company

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NATURE OF BUSINESS:
☐ Manufacturing ☐ Distributor
☐ Sales only ☐ Mfgrs. Rep.

Product Manufactured
_____

Number of Employees _____

Nature of Operation:
☐ Toolroom grinding
☐ Precision grinding
☐ Finishing operation
☐ Rough grinding
☐ Coated abrasive operation
☐ Abrasive grain operation
☐ Buffing and polishing

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PRODUCES PRECISION-CONTROLLED FINISH

The Model S-101 automatic polishing machine is a high production unit especially designed for producing superior finishes on sheet type materials. Its polishing operation is accomplished with an oscillating and rotating wheel drum made of abrasive impregnated nylon.

Selected grade of abrasive, variable oscillating motion of the drum, and adjustable feed rate provide a broad range of conditions with light abrasive action, to produce the most desirable precision-controlled finishes.

The abrasive wheel drum is positioned over the work for maximum ease of adjustment. Feed rate ranges from 20 to 69 fpm. Two machine models accommodate stock widths to 51" and 61" thicknesses up to 3".

Yates-American, Beloit, Wis.

Use postpaid card. Circle No. 75

MANUFACTURERS AGENTS & DISTRIBUTORS FOR COATED ABRASIVES

U. S. Distributor of Hermes coated abrasives, a quality product now being used by hundreds of U.S. firms, requires sales agents for several choice territories including Southern California, the Rocky Mountain States, Missouri, Southern Illinois, Kansas, Louisiana, Georgia, Alabama and others.

Write, giving background, territory covered and other product lines to:

UNITED MINERAL & CHEMICAL CORP.
16 Hudson Street, New York 13, N.Y.

Use postpaid card. Circle No. 255

Joint Stock Company in India, having obtained necessary license for installation, invites offers for supply of 'Know-How,' with or without capital participation, for manufacture of Electro Corundum (Aluminous Oxide) Grain. Quantity 3500 tons annually.

Also interested in separate offers for supply of complete Crushing and Sieving Plant.

Reply to Box 45
c/o GRINDING and FINISHING
Hitchcock Bldg.
Wheaton, Ill.

VIBRATORY PARTS FEEDER

The Elk-O-Matic Model 201 vibratory parts feeder handles parts up to 2½" maximum length in an 18" bowl. It is electromagnetically powered and vibrates 3600 times a minute. Because control is electric, it provides a continuous range of feed regulations to make it correspond to the best capacity of automatic production equipment.

Cast aluminum bowls for counterclockwise or clockwise feed are made with a single ⅞" track width or double ¾" track width.

Elk Engineering Works, St. Marys, Pennsylvania.

Use postpaid card. Circle No. 76

MAGNETIC PARTICLE TESTING

A complete family of materials for the wet method of visible and fluorescent magnetic particle testing consists of eight different materials—four for the visible red or black Magnaflux method and four for the more sensitive fluorescent Magnaglo method.

The concentrates can be added directly to the oil after measuring the proper amount in a graduated cup. A uniform suspension is obtained almost immediately.

Magnaflux Corporation, Subsidiary of General Mills, 7300 W. Lawrence Avenue, Chicago 31, Ill.

Use postpaid card. Circle No. 77

MIST PRECIPITATOR HAS MANY ADVANTAGES

The Trion OMP oil mist precipitator, when used in connection with all grinding operations, offers many advantages, including a healthier atmosphere for employees; lower heating and /or cooling cost; increased production; and reduced maintenance costs from reduction of oily mist settling on plant equipment and fixtures.

The Trion OMP may be mounted on the machine or remotely located. Its integrated blower is adjustable to output requirements and is capable of handling long runs of duct.

A circuit regulator provides built-in protection against overload and automatic compensation for 120 ac line voltage variations. The corrosion-resistant aluminum collecting cell can be removed for maintenance or inspection.

Trion, Inc., 1000 Island Ave., McKees Rocks, Pennsylvania.

Use postpaid card. Circle No. 78

HIGH STRENGTH DIAMOND BOND

The "welded-diamond" process of bonding industrial stones to steel shanks produces an adhesion so strong that a whole diamond can be butt-welded to the shank.

The process provides a strong bond which leaves up to 75% of the diamond to protrude. Advantages of the process are extended tool life through better thermal conductivity and lower initial cost resulting from economies in the bonding process.

Tools bonded by the new process can be used by the metal, ceramic, electronic, and carbide industries.

Vacuum Research Corporation, Queens, New York.

Use postpaid card. Circle No. 79

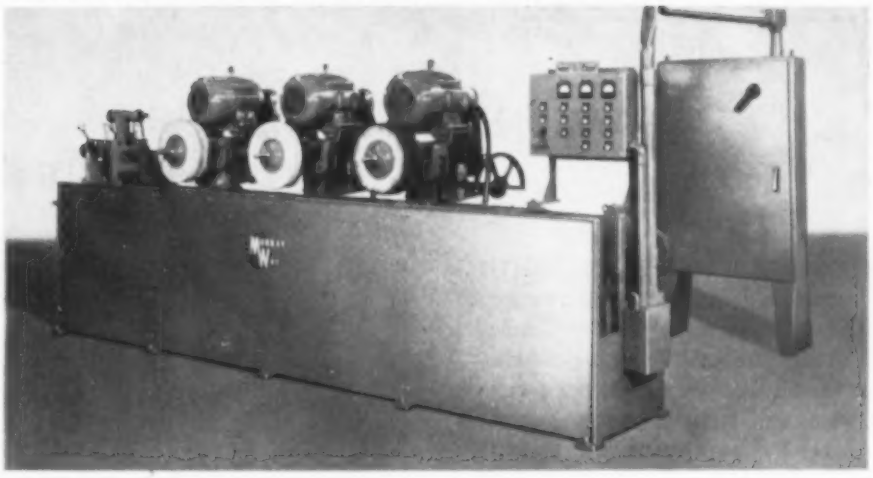
ORBITAL FINISHING SYSTEM

Controlled orbital finishing is available in a fully integrated system to speed handling and processing of metal and plastic parts. The new system permits steel ball burnishing of many parts. Other typical uses include deburring, rust and grease removal.

Rampe Manufacturing Co., 14915 Woodworth Ave., Cleveland 10, Ohio.

Use postpaid card. Circle No. 80

TESTS PRODUCTION METHODS, STANDARDS



Production speeds, work pressures, and feed rates for polishing and buffing operations are accurately determined in advance of actual production by Murray-Way Corporation's new, friction-free comparator machine.

It may also be used to test work wheels, horsepower usage, buffing and polishing compounds, and production parts or materials to assure that they meet standard specifications.

Wheel pressure is adjustable and remains constant once selected. Machine inertia and drag have been eliminated, and control panel readings are exact.

Heads are adjustable horizontally across the conveyor in a 5" range. Elevation may be screw-thread adjusted in an 8" range, and vertical float has a 6" range. Heads may be angularly positioned up to 45° either side of center in a horizontal plane.

Murray-Way Corporation, P. O. Box 180, Birmingham, Michigan.

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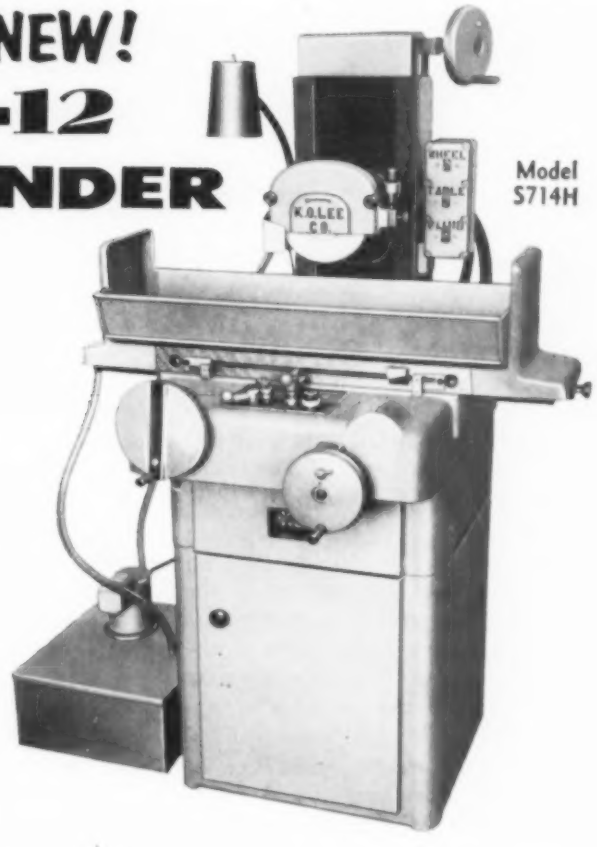
Announcing the NEW! 6-12 SURFACE GRINDER

Model S714H



features:

- ★ Spindle has duplex pre-loaded heavy duty ball bearings on each end. Spindle is driven with O-ring type belts for smooth operation.
- ★ Heavy cast iron construction throughout.
- ★ Extra length V and flat table ways distribute weight over greatest practical area for maximum table support and permanent accuracy.
- ★ Automatic oiling system. Ways are continuously lubricated.
- ★ Manual or hydraulic models available.
- ★ Cross feed hand wheel graduation .001", vertical hand wheel graduation .0001". Both can be instantly reset to zero or any other desired graduation.

Produces a finish equal to that of the highest priced surface grinders.

WRITE FOR COMPLETE LITERATURE

K. O. Lee Company, Aberdeen, S.D.

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GRINDING AND FINISHING AWARDED SAFETY HONOR

GRINDING AND FINISHING Magazine has been named a recipient of the National Safety Council's Public Interest Award for 1960.

M. M. Patterson, editor, received the award from General George C. Stewart, the Council's executive vice president.

The non-competitive award annually honors organizations in the specialized publications field for exceptional service to safety. Established in 1948, the Public Interest Awards are presented in recognition of leadership, initiative, and originality in the promotion of accident prevention.

In a letter notifying Patterson of the award, Council President Howard Pyle wrote:

"We here at the Council know all you have been doing for safety, and are delighted the judges agreed.

"I am sure you feel, as we do, that there is another dividend as a result of your safety efforts—the knowledge that you have helped prevent many accidents.

"Many thanks for your support."

General George C. Stewart, (left), executive vice president of the National Safety Council, congratulates M. M. Patterson, editor of GRINDING AND FINISHING Magazine, on presentation of the Council's Public Interest Award.

AGA PRODUCES BOOKLETS ON ABRASIVE GRAIN USES

The Abrasive Grain Association is preparing a series of booklets explaining the composition and the major uses of abrasive grain. They will be published late this year and are being written by M.M. Patterson, editor of GRINDING and FINISHING Magazine.

Each one of the end-use pamphlets will discuss the purpose of abrasive grain in operation, the factors influencing its use, the types of abrasives grain used, the reasons for their use, and the methods of application.

Two of the booklets will cover the history and the physical and chemical properties of abrasive materials. Each of the others will be concerned with some phase of their use—bonded and coated abrasives, blasting, barrel finishing, super-refractories, wire sawing, polishing, and others.

HIGGINS HONORED WITH TWO AWARDS

Milton P. Higgins, Norton Company's Chairman of the Board, was recently honored with two awards. The Advertising Club of Worcester, Mass., presented Higgins with its Isaiah Thomas Award which is given to citizens "whose personal efforts and accomplishments have made Worcester a better community in in which to live, to do business, and to enjoy living."

The Republic of Italy awarded Higgins its Star of Solidarity for his "active participation in the industrial activity of Italy, and the creation of Mole Norton S.p.A. (Norton's grinding wheel plant near Milan) . . ."

PRESS OPERATES FROM TWO STATIONS

A two-station hydraulic grinding wheel press that can be operated at different pressing strokes, tonnages, and daylight openings at each station is being readied for production by the Birdsboro Corp., Hydraulic Div., Reading, Pennsylvania.

The 1600-ton press is a single-action, down-movement, four-column machine equipped with interlocking controls which permit independent operation at each station at tonnages from 1600 down to 200 tons.

Each operator has a set up button which locks out the other station, thus preventing the second operator from taking control of the operation.

The press is self-contained, with the hydraulic pumping unit mounted on its top.

AMERICAN ANNOUNCES NEW CONSULTING SERVICE

A new consulting service, created to help users of vertical spindle surface grinding equipment with their critical grinding problems has recently been made available by American Emery Wheel Works, Providence, Rhode Island.

Given a brief of the job description, grinding equipment available, finishes and tolerances desired, and stock to be ground, American will conduct the necessary research and provide recommendations as to correct bond, abrasive, and grade of wheel for the particular job.

As part of the same service, American will detail recommended methods and procedures to be followed on the job and provide an estimate of production costs. For further information on the service contact: American Emery Wheel Works, 1 Richmond Square, Providence 1, R. I.

AMERICAN BUFF EXPANDS CUSTOM-ENGINEERING DEPT.

The American Buff Company of Chicago has expanded its custom-engineering department, which provides recommendations and solutions to manufacturers having special problems relating to the cutting, polishing, finishing and working of metal surfaces.

30 DISTRIBUTORS AT NORTON TRAINING COURSE

Some 30 representatives of West Coast distributors attended Norton Company's first full-scale distributor training course outside of the Worcester, Mass., main plant last March.

The sessions included lectures, discussions, and demonstrations on a wide variety of abrasive applications encountered in manufacturing. Eight instructors from the Worcester plant presented the course.

Purpose of the course was to improve the distributor's, salesmen's knowledge of the products they specify to customers.

Changing Faces . . .

C. G. Gould

K. H. Williamson

Norman Readman

F. Meyer, Jr.

John T. McHugh was recently made general plant manager at Precision Drawn Steel Co., Pennsauken, N. J. He was formerly division superintendent of Wire and Wire Products at the Donora Plant of the American Steel and Wire Division of U. S. Steel.

Charles G. Gould, assistant treasurer of Bay State Abrasive Products Company, Westboro, Mass., has been named general manager of Felker Mfg. Co., Torrance, Calif., a diamond wheel and machine manufacturing subsidiary of the Westboro Company.

Chicago Pneumatic Company has announced the election of the following men: Guy J. Coffey, chairman of the board and chief executive officer; Norman Readman, president; Thomas F. Noonan, vice president and comptroller; Carra L. Lane, vice president and manager of plant operations.

Joseph N. Kuzmick, divisional manager of Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., and director of the corporation, was recently elected vice president.

The Taft-Peirce Manufacturing Company, of Woonsocket, R. I., has announced appointment of three new vice presidents: Franklin Meyer, Jr., engineering; Kenneth H. Williamson, manufacturing; and John G. Zeiger, marketing. Dr. Walter M. Saunders, Jr., was named metallurgical director.

Robert B. Ayres was elected president and treasurer and Dwight C. Page was reelected executive vice president at recent stockholders' and directors' meetings of the Leon J. Barrett Company, Worcester, Mass.

William A. Kerr was elected a vice president of Bausch & Lomb, Inc. at a recent board of directors meeting.

Harold O. Kron has been named vice president in charge of engineering for Philadelphia Gear Corp., King of Prussia, Pa. William T. Brown was appointed vice president in charge of manufacturing.

Robert S. Jones was recently elected vice president and general manager of Jones and Lamson Machine Company, Springfield, Vt.

Walter I. Krewson, Jr., is new president of Superior Pneumatic and Manufacturing, Inc., Cleveland, Ohio.

Robert F. Gow, president of Norton Company, Worcester, Mass., has been elected a director of Miniature Precision Bearings, Inc., Keene, N. H.

John H. Diehl has been named assistant vice president, manufacturing, for Rockwell Manufacturing Company's Power Tool Division.

F. W. Witzke has been appointed vice president and chief administrative officer of the Cleveland Instrument Co., a subsidiary of the Bendix Corp.

Everett W. Harrison has been named controller of Wheel Trueing Tool Co., Detroit, Mich.

Robert Voltman has been named product development manager by MacDermid Inc., Waterbury, Conn.

E. L. Kapernaros was recently appointed manager, Diamond Application Engineering, Metallurgical Products Department, General Electric Co., Detroit, Mich.

Allen P. Wherry of the Steel Door Institute, Cleveland, Ohio., has been named secretary of the American Standard Association sectional committee charged with developing standards on abrasives.

The Machine Tool Division of Browne & Sharpe Mfg. Co. has appointed Earl P. Leeds superintendent of the Milling and Grinding Machine Group.

Charles G. Mackie has been named to the newly-created position of chief engineer in charge of new products development for the Chicago Screw Company, Division of Standard Screw Company.

The Bendix Corporation has announced the election of Dr. R. D. O'Neal as vice president in charge of engineering and R. H. Isaacs as vice president in charge of government relations.

Peter Koopman has joined General Abrasive Company, Inc., Niagara Falls, N. Y., as research engineer.

The appointment of John W. Manquen as technical director for the Metal Finishing Division of Frederic B. Stevens, Inc., Detroit, Mich., has been announced.

Frank E. Massard has been appointed manager of advertising of The Carborundum Co., Niagara Falls, N. Y. Henry J. Killmar has been named manager of the New Products Branch of the company's Research and Development Division. Frederick J. Ross, Jr., was appointed assistant to the general manager of the Bonded Abrasives Division.

William C. Adamson has been made works manager of Thor Power Tool Company's main plant in Aurora, Illinois.

Five-day training courses in nondestructive testing conducted by Magnaflux Corporation at its main plant in Chicago are now under the direction of Bruce D. Tyler.

Harry G. Brustlin has been named general sales manager of Norton Company's Abrasive Division. Everett L. Sinclair is now manager, product engineering, grinding wheels. John U. Calder, is assistant to the general sales manager, Abrasive Division.

James Garland has been named finishing sales representative in Western Pennsylvania for Frederic B. Stevens, Inc.

Thomas Walsh has been appointed a district sales manager by the Wilton Tool Mfg. Co., Inc., for the central district.

O. J. Groene and Dan Thornton, of the Grof Mfg. Co., Cleveland, Ohio, were recently named representatives of the A.I.T. Diamond Tool Co., in the Cleveland and northern Ohio areas.

Size Control Co., a division of American Gage and Machine Co., Chicago, Ill., has announced the following appointments: Peter J. Somer, vice president and general manager; Thomas J. Owen, vice president of manufacturing; and Frank J. Vlasaty, sales manager.

Kenneth S. Cowlin has been appointed to the newly-created position of general sales manager of Electro Refractories and Abrasives Corp., Buffalo, N. Y.

Alex V. Durovich has been named an abrasive engineer for the Sterling Grinding Wheel Co., Tiffin, Ohio.

Russell B. Berg has been named a Chicago area service engineer for the Rotor Tool Co., Cleveland, Ohio.

KAY & WARREN COMPANY

Reclaimers of

Industrial Diamonds and Diamond Powders

33 Box Street **Brooklyn 22, N.Y.**

Our reclaiming department salvages diamond powders from wheels, sludges, hones, saw blades, cotton wastes or any type of diamond bearing material. We will submit quotations on an analysis basis.

Inquiries Invited!

PHILADELPHIA, REP.
T. W. MONTGOMERY
HUNTINGTON & TERWOOD ROADS, HATBORO, PA.

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or say you saw it in

GRINDING and FINISHING

The Abrasives Division of the Elgin National Watch Co. has announced the promotion of James H. Cupps to sales supervisor, Diamond Wheels.

Larry Nelson has been named chief engineer of the W. E. Sly Mfg. Co., Cleveland, Ohio.

Robert F. Cox recently joined Pangborn Corp. as a sales engineer.

John G. Bollardi has been named manager of custom service for the coated abrasives division of Armour Alliance Industries, Alliance, Ohio.

R. Warren Aldridge, Jr., has been named Florida division manager for the Van Norman Machine Co. (automotive division).

Kenneth R. Beardslee retired April 1 as consultant to the metallurgical products department of General Electric Co.

Thomas L. Whitehouse has joined the engineering staff of the Rotor Tool Co. of Cleveland as field engineer doing product research. John S. Howey and Edgar E. Jones are Rotor Tool's new direct factory representatives for the Pittsburgh area.

Aldo J. Sartor, sales engineer, has been transferred to Pangborn Corporation's West Coast office, Pasadena, Calif.

Norton Company has announced the following changes in its sales organization: John E. Taylor, grinding wheel sales representative for the Canton, Ohio, area; Michael R. Parrott, field specialist for grinding wheels assigned to the Chicago district office; John E. Taylor, sales representative, Cleveland, Ohio; Allen S. White, sales representative, Toledo, Ohio; J. Robert Lowry, sales representative, Atlanta, Ga.

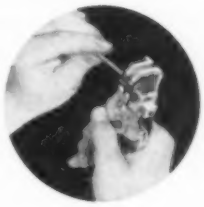
The F. L. Bishop Co., Atlanta, Ga., has been appointed sales agent for the southeastern section of the country by the Pneumatic Tool Division, Thomas C. Wilson, Inc., Long Island City, New York.

Roland G. Becker has been named assistant sales manager of Bay State Abrasive Products Co., Westboro, Mass.

Stanley C. Long has been named sales and service representative for the Province of Ontario by the Mid-West Abrasive Company of Canada, Ltd.

YOU, TOO, CAN PAY FOR A FILTRATION UNIT IN 9 MONTHS!

SEE HOW BARNESDRIL SAVED IDEAL INDUSTRIES $3057 ANNUALLY ON A $2100 INVESTMENT . . .



. . . by adding a MP 25 Kleenall Combination Magnetic and Fabric Filter to a Thompson grinder. Now, blades for Ideal Industries' excellent Wire Strippers are ground in one pass to exacting tolerances, .005" on the points and .001" on wire diameters. Rejects, formerly amounting to 2% or more, are now negligible. Wheel life has been extended considerably. A pretty sound investment for Ideal Industries, Inc., don't you agree?

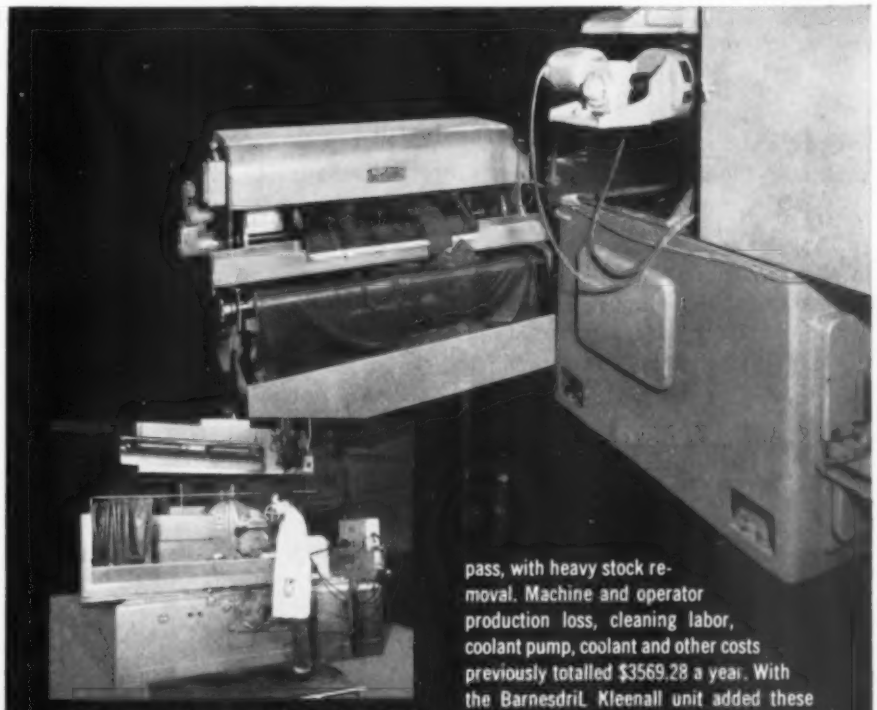
Learn how BarnesdriL Filtration Units can improve the quality of your products! Write for catalogs 100-A and 300-D!

BARNESDRIL FILTRATION UNITS

Honing Machines/Production Units
Filtration Units/Drilling Machines

BARNES DRILL CO.

870 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE • 13121 PURITAN AVENUE



This Thompson True Forming Grinder at Ideal Industries, Inc., Sycamore, Illinois, is using coolant with a 300 SSU viscosity, flowing at 5-10 GPM. Rough and finish grinding on the Wire Stripper blades is made in one wheel pass, with heavy stock removal. Machine and operator production loss, cleaning labor, coolant pump, coolant and other costs previously totalled $3569.28 a year. With the BarnesdriL Kleenall unit added these costs were reduced to $511.52 per year. In addition to models such as this, BarnesdriL produces Kleenall Fabric Filters, Magnetic Coolant Separators and Central Systems to help you effect production savings.

Use postpaid card. Circle No. 261

Horace B. Van Dorn has been elected vice president in charge of engineering of the Fafnir Bearing Co., New Britain, Conn. Howell L. Potter has assumed Van Dorn's former post as director of engineering. Van Dorn succeeds Fayette Leister who has retired. He has been with Fafnir since graduating from Massachussetts Institute of Technology in 1937.

Russell C. Spera was named vice president in charge of production for Schaevitz Engineering, Pennsauken, N.J. Spera was the company's second employee, having joined the firm shortly after it was organized in 1946. The company now employs 250 people. Spera was retained as assistant to the president after completing a technical education in electronics.

William R. Benn, formerly with Union Carbide Metals Co., has been appointed manager of the Carborundum Company's Market Development Department, Research and Development Division.

The appointment of Joseph J. Diamond as vice president, field sales, for The Porter-Cable Machine Company has been announced.

The appointment of S. R. Zimmerman, Jr. as executive vice president, Raybestos-Manhattan, Inc., Passaic, New Jersey, has been announced.

Clifford Poole, who has served as an official of several Detroit area companies, has been appointed assistant treasurer and assistant secretary of Michigan Abrasive Company, Detroit, Michigan.

The Gisholt Machine Company, Madison, Wisconsin, has elected William L. Saunders of Chicago, Illinois, to its board of directors. Saunders is a vice president and director of A. G. Becker & Co., Inc., investment bankers.

The Abrasives Division of the Elgin National Watch Co. has appointed the Matticks Co., 4176 East Pacific Way, Los Angeles, Calif., as the western wholesaler for Elgin Golden Circle Solid Carbide Tools.

Edmund West is now works manager of the Allen Mfg. Co., Hartford, Connecticut.

Roland R. Volker was named assistant sales manager, Precision Parts Division of Ex-Cell-O Corp., Detroit, Mich.

Harry Martin has retired as sales manager of the Detroit Division of E. F. Houghton & Co. He has been succeeded by James H. Richards.

R. B. Park was appointed sales manager, Industrial Rubber and Mechanical Packings Division of Raybestos-Manhattan, Inc., Passaic, New Jersey.

Gerald D. Johnson has joined the National Abrasives organization of San Leandro, Calif.

John J. Zook is now National Service manager and Schuyler Livingston is regional sales engineer of the Cleveland Metal Abrasive Co.

Stillman Reed and Stephen Szaban are now assistant sales managers for the Van Norman Machine Co., of Springfield, Mass.

David D. Hill has been appointed Coated Abrasives Division sales manager for Carborundum Company's Pittsburgh, Pa. district.

Around the Industry . . .

Simonds Abrasive Co. has announced the opening of a new Southern California branch warehouse, sales office, and service shop in Los Angeles.

National Automatic Tool Co. has purchased the Bucyrus-Erie Company plant at Richmond, Ind. The plant contains 365,000 square feet of floor space.

A newly-completed plant in Asheville, N.C., has been acquired under a long-term lease by SKF Industries, Inc.

Bacon Felt Co. has acquired an additional 17,000 square feet of manufacturing area at 15 Fourth Street, Taunton, Mass., in a building adjacent to Bacon's present plant.

The Landis Tool Co., Waynesboro, Pa., has announced the appointment of Toyoda Tsusho Ltd., Machinery Department, 22111, Sasashima-Cho, Nakamura-Ku, Nagoya, Japan, as its Japanese distributor for Landis precision cylindrical grinders.

Besly-Welles Corp. of South Beloit, Ill., has opened a combination branch office and warehouse at 1150 East 9 Mile Road, Detroit, Mich.

The DoAll Co. has opened its first overseas sales-service store in Dusseldorf, West Germany, to provide European industry with a broad line of its American-made manufacturing tools.

Jack T. Welch, vice president-sales, of The Sheffield Corporation has transferred to Bendix International, New York, where he is director of industrial marketing for the division.

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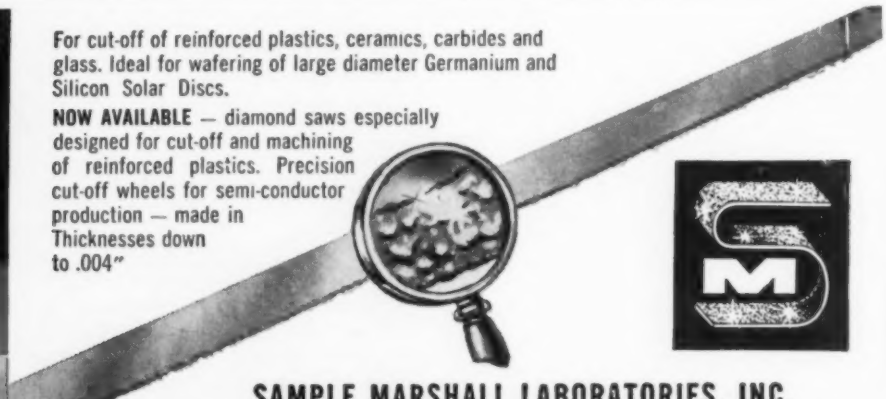

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A major expansion and relocation of its Industrial Filter Division has been announced by Fram Corp. New headquarters are in the Tulsa, Okla., plant of its Warner-Lewis subsidiary.

Hoffman Industries, Inc., a subsidiary of Hoffman International has acquired the Air Appliance and Filtration Divisions of the U. S. Hoffman Machinery Corporation.

Moore Special Tool Company, Bridgeport, Conn., has established an export division in the Empire State Building, New York City. Joseph F. Rizzo has been named export manager.

The former Lord Chemical Corporation, York, Pa., will now be known as Lord Chemical and Equipment Division of Wheelabrator, Corp., Mishawaka, Ind.

The Carborundum Company and its subsidiary, Pacific Abrasive Supply Company, have moved their offices and stocks to a new $1.5 million Abrasive Service Center, 2240 South Yates Avenue, Los Angeles, Calif.

Main offices and service facilities of the newly-formed Rotor Tool Co. of Canada Limited will be at 14 Taber Road, Rexdale, Ontario.

The Fonda Gage Co., Inc., Stamford, Conn., has named Alexander Tools Limited and Alexander Tools (Quebec) Limited as their distributors in the Provinces of Ontario and Quebec.

The Abrasives Division of the Elgin National Watch Co., Elgin, Ill., has announced the appointment of the following companies as distributors for the division's diamond wheel products: Adroit Tool & Supply, Inc., Santa Ana, Calif.; A .S. Childs Co., Inc., Worcester, Mass.; H. D. Geisler Co., Inc., Dayton, Ohio; Industrial Diamond Products, Fort Worth, Tex. and Houston, Tex.; Ohio Abrasive & Tool Co., Cleveland, Ohio; and Quality Mill Supply Co., Inc., Indianapolis, Ind., and Columbus, Ind.

The formation of Wallace Filters, Inc., Lebanon, Ind., was announced by Charles I. Wallace, former president of Indiana Commercial Filters Corp., Lebanon. The new firm will design, manufacture, develop, distribute, and sell all types of industrial filters.

The De Laval Separator Co., Industrial Division, Poughkeepsie, N. Y., has announced the following appointments: R. E. LeMire, district manager in the firm's new office in St. Louis, Mo.; O. H. Jacobsmeyer, Jr., assistant to LeMire; Wayne Patterson, R. A. Street and Robert E. Wood, sales engineers.

The Enco Supply Co., Springfield, Mass., and the Ellsworth Industrial Supply Co., Stratford, Conn., have been appointed distributors of the J. T. Slocomb line of micrometers and industrial measuring instruments.

The Barrel Finishing Equipment Division of the Baird Machine Co., Stratford, Conn., has announced the appointment of the following distributors: Aldachris Ultrasonic Distributing Co., Cleveland, Ohio; Davies Supply and Mfg. Co., St. Louis, Mo.; the Bill Young Co., Cincinnati, Ohio; and the Donald Sales and Mfg. Co., Milwaukee, Wis.

Rivett Lathe & Grinder, Inc., Boston, Mass., has appointed Hyrdo Air., Inc., a distributor of its air and hydraulic valves and cylinders.

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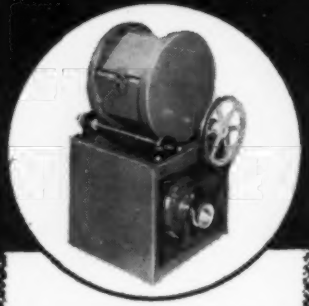

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What's happened to our National Purpose over the years? Submerged! Almost smothered under woolly, stuffy apathy! Industrialization, wealth and productive strength have become opiates, and success has wafted us on a pink cloud into a world of gaudy peacocks. The other—the real world—is undergoing a second industrial revolution.

That same industrialization which has made our country great is taking place all over the globe. The world is on the march. Others would be great, would be wealthy, and are traveling our road with machines and technology. In this march we have helped. Rarely, in the history of man, has any nation given to others so much of itself, its skills and its knowledge. This we do not regret. Greatness carries its responsibilities and wealth its obligations. And now that others have shared our bread and are strong, we neither condemn nor regret. If we are weakened, it is less from having given than from resting too long.

Alas, history moves faster than we think. Today, a nation becomes industrially mighty in less than ten years instead of 100 years, and becomes a second-rate power just as quickly. Here let us take warning! World industrialization, plus American obsolescence and apathy, mean eventual total economic engulfment.

The mere replacement of equipment is not enough. What is needed, in addition, is a National Purpose. The cold realization that those things which need doing to meet world-wide competition are being done because it is a national necessity, that the welfare of the nation depends on this. Personal interests must rise to the highest level of national consciousness. Our eyes must be lifted up and the feeling of greatness and unity be reached at a height far above the immediate competitive advantage level. This we must do. We can do no less. It is late. It is late!

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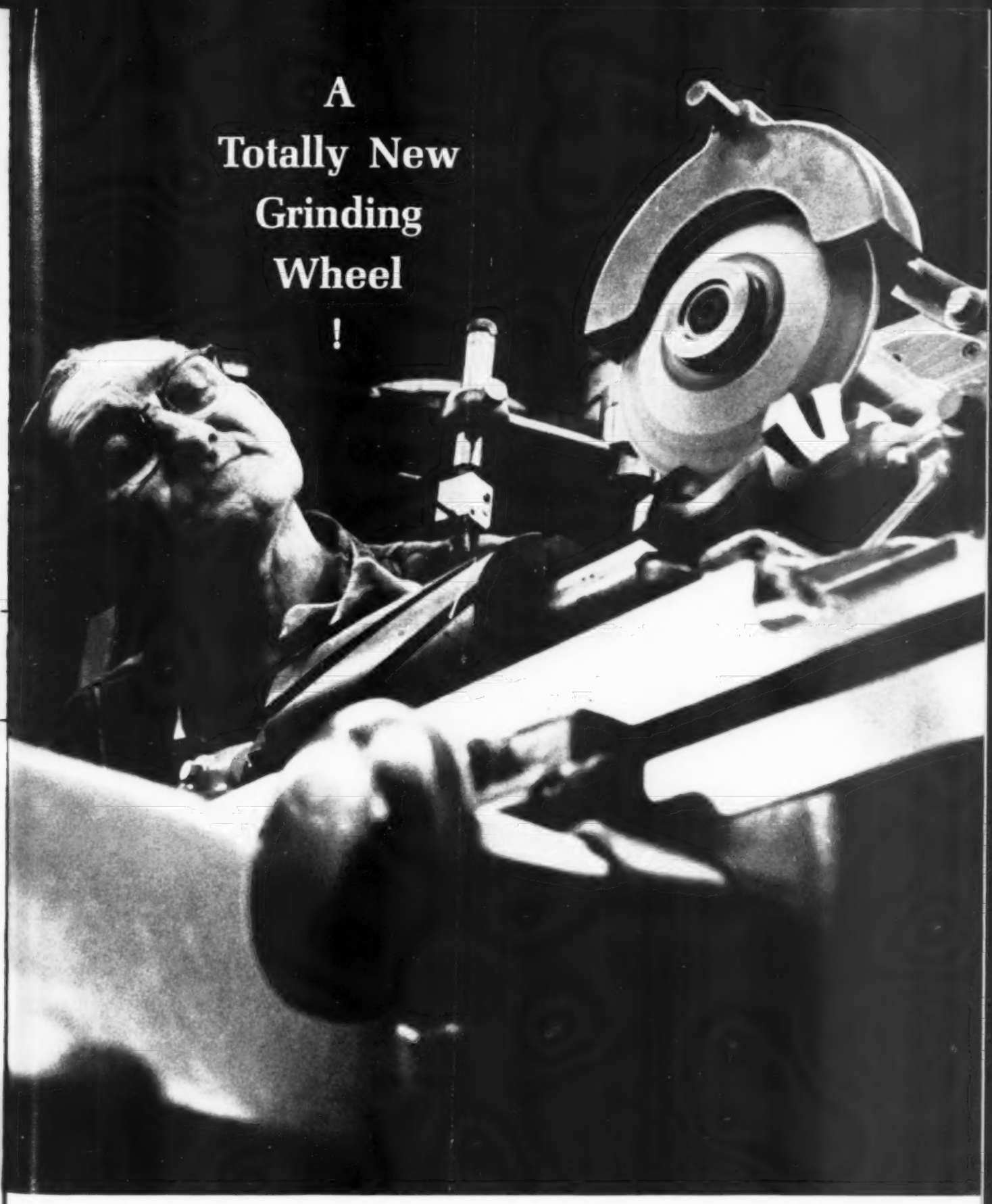

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